

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
)
Christophe Francois Guy GILBERT et al.) Group Art Unit: To Be Assigned
)
Application Number: To Be Assigned) Examiner: To Be Assigned
)
Filed: January 26, 2001)
)
For: STREPTOCOCCUS PNEUMONIAE PROTEINS AND NUCLEIC ACID
MOLECULES

SUBMISSION OF SEQUENCE LISTING

Commissioner for Patents
Washington, D.C. 20231

Sir:

Applicants submit herewith a paper copy of the Sequence Listing as filed in parent application number PCT/GB99/02451 filed July 27, 1999. The Sequence Listing in this application is identical to the Sequence Listing submitted in the parent application.

Applicants respectfully submit that it is unnecessary to file a computer readable form of the Sequence Listing, since it would be a duplicate of the computer readable form submitted in parent application number PCT/GB99/02451. Therefore, in accordance with 37 C.F.R. §1.821(e), no computer readable form is enclosed.

Applicants herewith request that the computer readable form submitted in parent application number PCT/GB99/02451 be used in this application. The undersigned certifies his belief that the computer readable form submitted in the parent application is identical in content to the paper copy of the Sequence Listing enclosed herewith.

SEQUENCE LISTING

<110> Microbial Technics Limited
Gilbert, Christophe FG
Hansbro, Philip M

<120> Proteins

<130> PWC/P21129WO

<140> PCT/GB99/02451

<141> 1999-07-27

<150> GB 9816337.1

<151> 1998-03-27

<150> US 60/125164

<151> 1999-03-19

<160> 388

<170> PatentIn Ver. 2.1

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Ile Asp Val Glu Pro Val Phe Gly Gln Ile Lys Ala Ser Leu Gly Tyr
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Lys Arg Cys Asn Leu Arg Gly Lys Arg Gln Val Arg Ile Asp Met Gly
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Thr Glu Gln Ser Glu Pro Ser Ser Thr Glu Ala Ile Ala Ser Glu Lys

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Lys Leu Asn Ala Asn Ser Lys Glu Ala Ile Lys Pro Asp Ala Asp Val

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003610 056960

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Gly Gly Glu Ala Trp Tyr Arg Lys Thr Phe Lys Leu Asp Glu Lys Asp
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Glu Asn Val Ile Ala Val His Ala Val Asn Lys Gln Pro Ser Ser Arg
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Trp Tyr Ser Gly Ser Gly Ile Tyr Arg Asp Val Thr Leu Gln Val Thr
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Asp Lys Val His Val Glu Lys Asn Gly Thr Thr Ile Leu Thr Pro Lys
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Ile Val Asn Thr Asp Asp Lys Asp His Glu Leu Val Ala Glu Tyr Gln
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Ile Val Glu Arg Gly Gly His Ala Val Thr Gly Leu Val Arg Thr Ala
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Ser Arg Thr Leu Lys Ala His Glu Ser Thr Ser Leu Asp Ala Ile Leu
370 375 380

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Ala Lys Lys Asp Leu Phe Gly Tyr Arg Tyr Tyr His Trp Thr Pro Asn
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Glu Leu Gly Leu Leu Val Gln Glu Glu Ala Phe Asp Thr Trp Tyr Gly
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Gly Lys Lys Pro Tyr Asp Tyr Gly Arg Phe Phe Glu Lys Asp Ala Thr
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His Pro Glu Ala Arg Lys Gly Glu Lys Trp Ser Asp Phe Asp Leu Arg
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Thr Met Val Glu Arg Gly Lys Asn Asn Pro Ala Ile Phe Met Trp Ser
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Il Gly Asn Glu Ile Gly Glu Ala Asn Gly Asp Ala His Ser Leu Ala
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00760701301
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Tyr Leu Glu Gly Gln Pro Ile His Ala Thr Leu Val Val Glu Glu Gly
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Val Thr Gly Leu Thr Ser Gln Lys Pro Met Gln Tyr Arg Thr Leu Ala
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Tyr Gly Ala Lys Leu Pro Glu Val Thr Ala Ser Ala Lys Asn Ala Ala
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Phe Ile Gln Pro Lys Asp Gly Gly Pro Leu Gln Thr Tyr Ala Ile Gln
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00759797 013501

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Gln Glu Pro Ser Leu Pro Ala Thr Val Thr Val Glu Tyr Asp Lys Gly
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Ser Val Asp Asn Leu Ser Val Gly Phe His Glu Asp His Gly Val Gly
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Thr Ala Pro Lys Asn Pro Ser Phe Val Gly Asn Glu Asp His Val Phe
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00260707 043604

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 1795 1800 1805

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Asp Glu Asn Ser Asn Gln Ala Phe Ala S r Ala Thr Asn Asp Ile Asp
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 1890 1895 1900

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 1905 1910 1915 1920

Glu Val Pro Thr Tyr Tyr Ser Asn Tyr Gln Ala Tyr Asp Ala Asp His
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Pro Phe Asn Asn Pro Glu Asn Trp Glu Ala Val Pro Tyr Arg Ala Asp
 1940 1945 1950

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 1955 1960 1965

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Gly Val Ala Met Ile Glu Met Thr Phe Leu Ala Pro Ser Glu Leu Pro
 1985 1990 1995 2000

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 2005 2010 2015

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Asp Glu Lys Gln Val Asp Tyr Ser Asn Lys Asn Gln Glu Glu Val Asp

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Gln Asn Lys Phe Arg Ile Gln Ile Asp Lys Thr Glu Leu Phe Val Thr

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Thr Asp Lys His Leu Glu Lys Asn Cys Cys Lys Leu Glu Leu Glu Pro

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Glu Asp Asn Leu Asp Asn Lys Ile Lys Glu Asn Val Ser His Leu Asp

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Asn Arg Gly Gly Asn Ile Glu His Asp Lys Asp Asn Leu Glu Ser Ser

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Glu Ser Tyr Lys Leu Tyr Ser Lys Ser Asn Ser Lys Val Ser Ile Ala

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Lys Glu Glu Gly Glu Glu Gly Ile Ile Ser Asp Ile Gln Asp Arg Leu
210 215 220

Gly His Gly Thr Ala Val Val Ala Gln Ile Val Gly Asp Asp Asn Ile
225 230 235 240

Asn Gly Val Asn Pro His Val Asn Ile Asn Val Tyr Arg Ile Phe Gly
245 250 255

Lys Ser Ser Ala Ser Pro Asp Trp Ile Val Lys Ala Ile Phe Asp Ala
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Val Asp Asp Gly Asn Asp Ile Ile Asn Leu Ser Thr Gly Gln Tyr Leu
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Met Ile Asp Gly Glu Tyr Glu Asp Gly Thr Asn Asp Phe Glu Thr Phe
290 295 300

Leu Lys Tyr Lys Lys Ala Ile Asp Tyr Ala Asn Gln Lys Gly Val Ile
305 310 315 320

Ile Val Ala Ala Leu Gly Asn Asp Ser Leu Asn Val Ser Asn Gln Ser
325 330 335

Asp Leu Leu Lys Leu Ile Ser Ser Arg Lys Lys Val Arg Lys Pro Gly
340 345 350

Leu Val Val Asp Val Pro Ser Tyr Phe Ser Ser Thr Ile Ser Val Gly
355 360 365

Gly Ile Asp Arg Leu Gly Asn Leu Ser Asp Phe Ser Asn Lys Gly Asp
370 375 380

00760707 015607

Ser Asp Ala Ile Tyr Ala Pro Ala Gly Ser Thr Leu Ser Leu Ser Glu
385 390 395 400

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Ile Phe Ser Ala Thr Leu Gly Gly Tyr Thr Tyr Leu Tyr Gly Asn Ser
420 425 430

Phe Ala Ala Pro Lys Val Ser Gly Ala Ile Ala Met Ile Ile Asp Lys
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<212> PRT

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Ile Asn Met Gly Cys Pro Val Asn Lys Ile Val Lys Asn Glu Ala Gly
115 120 125

Ala Met Trp Leu Lys Asp Pro Asp Lys Ile Tyr Ser Ile Ile Asn Lys
130 135 140

Val Gln Ser Val Leu Asp Ile Pro Leu Thr Val Lys Met Arg Thr Gly
145 150 155 160

Trp Ala Asp Pro Ser Leu Ala Val Glu Asn Ala Leu Ala Ala Glu Ala
165 170 175

Ala Gly Val Ser Ala Leu Ala Met His Gly Arg Thr Arg Glu Gln Met
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Tyr Thr Gly His Ala Asp Leu Glu Thr Leu Tyr Lys Val Ala Gln Ala
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Leu Thr Lys Ile Pro Phe Ile Ala Asn Gly Asp Ile Arg Thr Val Gln
210 215 220

Glu Ala Lys Gln Arg Ile Glu Glu Val Gly Ala Asp Ala Val Met Ile
225 230 235 240

Gly Arg Ala Ala Met Gly Asn Pro Tyr Leu Phe Asn Gln Ile Asn His
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Tyr Phe Glu Thr Gly Glu Ile Leu Pro Asp Leu Thr Phe Glu Asp Lys
260 265 270

Met Lys Ile Ala Tyr Glu His Leu Lys Arg Leu Ile Asn Leu Lys Gly
275 280 285

Glu Asn Val Ala Val Arg Glu Phe Arg Gly Leu Ala Pro His Tyr Leu
290 295 300

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<213> Streptococcus pneumoniae

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Ile Pro Ser Leu Leu Gln Ser Tyr Ser Lys Ser Leu Thr Ile Ser Ala
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His Leu Lys Arg Asp Ile Val Asp Lys Arg Leu Pro Leu Val His Asp
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Leu Asp Ile Lys Asp Gly Lys Leu Ser Asn Tyr Ile Val Met Leu Asp
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Met Ser Val Ser Thr Ala Asp Gly Lys Gln Val Thr Val Gln Phe Val
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His Gly Val Asp Val Tyr Lys Glu Ala Lys Asn Ile Leu Leu Leu Tyr
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Tyr Phe Tyr Thr Lys Arg Leu Leu Asn Pro Leu Phe Tyr Ile Ser Glu
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Val Thr Ser Lys Met Gln Asp Leu Asp Asp Asn Ile Arg Phe Asp Glu
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Ser Arg Lys Asp Glu Val Gly Glu Val Gly Lys Gln Ile Asn Gly Met
195 200 205

Tyr Glu His Leu Leu Lys Val Ile Tyr Glu Leu Glu Ser Arg Asn Glu
210 215 220

Gln Ile Val Lys Leu Gln Asn Gln Lys Val Ser Phe Val Arg Gly Ala
225 230 235 240

Ser His Glu Leu Lys Thr Pro Leu Ala Ser Leu Arg Ile Ile Leu Glu
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Asn Met Gln His Asn Ile Gly Asp Tyr Lys Asp His Pro Lys Tyr Ile
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Ala Lys Ser Ile Asn Lys Ile Asp Gln Met Ser His Leu Leu Glu Glu
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Val Leu Glu Ser Ser Lys Phe Gln Glu Trp Thr Glu Cys Arg Glu Thr
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Thr Val Lys Pro Val Leu Val Asp Ile Leu Ser Arg Tyr Gln Glu Leu
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<213> Streptococcus pneumoniae

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35 40 45

Lys Val Pro Ser Phe Phe Ala Gly Gln His Ile Pro Leu Gly Val Glu
245 250 255

Asp Gly Glu Met Met Ile Phe Phe Ser Phe Leu Leu Ser His Arg Ile
260 265 270

Leu Pro Leu His Thr Met Glu Tyr Ile Leu Gly Phe Gly Gly Gln Leu
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Ala Asp Leu Leu Thr Gln Leu Ile Gln Glu Met Lys Lys Glu Glu Leu
290 295 300

Leu Gly Asp Tyr Thr Glu Asp His Val Thr Tyr Glu Leu Ser Gln Leu
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Cys Ala Gln Val Tyr Leu Tyr Lys Gly Tyr Ile Leu Gln Asp Arg Tyr
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Lys Tyr Gln Leu Glu Asn Arg His Pro Tyr Leu Leu Met Glu His Asp
340 345 350

Phe Lys Glu Thr Ala Glu Glu Ile Phe His Ala Leu Pro Ala Phe Gln
355 360 365

Gln Gly Thr Asp Leu Asp Lys Lys Ile Leu Trp Glu Trp Leu Gln Leu
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Ile Glu Tyr Met Ala Glu Asn Gly Gly Gln His Met Arg Ile Gly Leu
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Asp Leu Thr Ser Gly Phe Leu Val Phe Ser Arg Met Ala Ala Ile Leu
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Lys Arg Tyr Leu Glu Tyr Asn Arg Phe Ile Thr Ile Glu Ala Tyr Asp
420 425 430

Pro Ser Arg His Tyr Asp Leu Leu Val Thr Asn Asn Pro Ile His Lys
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Lys Glu Gln Thr Pro Val Tyr Tyr Leu Lys Asn Asp Leu Asp Met Glu
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 35 40 45

Glu Met Gln Asp Phe Ala Glu Gly Thr Ser Ser Arg Ser Thr Lys Leu
 50 55 60

Val His Gly Gly Leu Arg Tyr Leu Lys Gln Phe Asp Val Glu Val Val
 65 70 75 80

Ser Asp Thr Val Ser Glu Arg Ala Val Val Gln Gln Ile Ala Pro His
 85 90 95

Ile Pro Lys Ser Asp Pro Met Leu Leu Pro Val Tyr Asp Glu Asp Gly
 100 105 110

Ala Thr Phe Ser Leu Phe Arg Leu Lys Val Ala Met Asp Leu Tyr Asp
 115 120 125

Leu Leu Ala Gly Val Ser Asn Thr Pro Ala Ala Asn Lys Val Leu Ser
 130 135 140

TOGETHER 28269260

Lys Asp Gln Val Leu Glu Arg Gln Pro Asn Leu Lys Lys Glu Gly Leu
145 150 155 160

Val Gly Gly Gly Val Tyr Leu Asp Phe Arg Asn Asn Asp Ala Arg Leu
165 170 175

Val Ile Glu Asn Ile Lys Arg Ala Asn Gln Asp Gly Ala Leu Ile Ala
180 185 190

Asn His Val Lys Ala Glu Gly Phe Leu Phe Asp Glu Ser Gly Lys Ile
195 200 205

Thr Gly Val Val Ala Arg Asp Leu Leu Thr Asp Gln Val Phe Glu Ile
210 215 220

Lys Ala Arg Leu Val Ile Asn Thr Thr Gly Pro Trp Ser Asp Lys Val
225 230 235 240

Arg Asn Leu Ser Asn Lys Gly Thr Gln Phe Ser Gln Met Arg Pro Thr
245 250 255

Lys Gly Val His Leu Val Val Asp Ser Ser Lys Ile Lys Val Ser Gln
260 265 270

Pro Val Tyr Phe Asp Thr Gly Leu Gly Asp Gly Arg Met Val Phe Val
275 280 285

Leu Pro Arg Glu Asn Lys Thr Tyr Phe Gly Thr Thr Asp Thr Asp Tyr
290 295 300

Thr Gly Asp Leu Glu His Pro Lys Val Thr Gln Glu Asp Val Asp Tyr
305 310 315 320

Leu Leu Gly Ile Val Asn Asn Arg Phe Pro Glu Ser Asn Ile Thr Ile
325 330 335

Asp Asp Ile Glu Ser Ser Trp Ala Gly Leu Arg Pro Leu Ile Ala Gly
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Asn Ser Ala Ser Asp Tyr Asn Gly Gly Asn Asn Gly Thr Ile Ser Asp
 355 360 365

Glu Ser Phe Asp Asn Leu Ile Ala Thr Val Glu Ser Tyr Leu Ser Lys
 370 375 380

Glu Lys Thr Arg Glu Asp Val Glu Ser Ala Val Ser Lys Leu Glu Ser
 385 390 395 400

Ser Thr Ser Glu Lys His Leu Asp Pro Ser Ala Val Ser Arg Gly Ser
 405 410 415

Ser Leu Asp Arg Asp Asp Asn Gly Leu Leu Thr Leu Ala Gly Gly Lys
 420 425 430

Ile Thr Asp Tyr Arg Lys Met Ala Glu Gly Ala Met Glu Arg Val Val
 435 440 445

Asp Ile Leu Lys Ala Glu Phe Asp Arg Ser Phe Lys Leu Ile Asn Ser
 450 455 460

Lys Thr Tyr Pro Val Ser Gly Gly Glu Leu Asn Pro Ala Asn Val Asp
 465 470 475 480

Ser Glu Ile Glu Ala Phe Ala Gln Leu Gly Val Ser Arg Gly Leu Asp
 485 490 495

Ser Lys Glu Ala His Tyr Leu Ala Asn Leu Tyr Gly Ser Asn Ala Pro
 500 505 510

Lys Val Phe Ala Leu Ala His Ser Leu Glu Gln Ala Pro Gly Leu Ser
 515 520 525

Leu Ala Asp Thr Leu Ser Leu His Tyr Ala Met Arg Asn Glu Leu Thr
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Ser Asn Ser Ser Gly Trp Ile Val Ile Thr Met Gly Trp Gly Ile Ala
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Val Ala Val Ala Val Phe Val Ser Gly Lys Leu Ser Pro Ala Tyr Leu
 50 55 60

Asn Pro Ala Val Thr Ile Gly Val Ala Leu Lys Gly Gly Leu Pro Trp
 65 70 75 80

Ala Ser Val Leu Pro Tyr Ile Leu Ala Gln Phe Ala Gly Ala Met Leu
 85 90 95

1369360

15

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Arg Thr Ser Leu Thr Glu Ile Leu Thr Arg Glu Ala Glu Glu Leu Val
20 25 30

Val Ile Gly Ala Tyr Ala Ser Lys Lys Ala Tyr Thr Ser Pro Phe Ser
225 230 235 240

Glu Gly Asn Leu Tyr Gln Ala Ser Val Lys Phe Leu His His Leu Ala
 245 250 255

Ser Lys Tyr Gln Thr Pro Ala Gln Asp Cys Ser Gln Thr His Glu Lys
 260 265 270

Met Asp Ser Phe Asp Lys Ala Ser Arg Leu Leu Glu Ser Ser Tyr Asp
 275 280 285

Phe Ser Glu Leu Ala Leu Asp Val Asp Glu Lys Asp Arg Glu Asn Leu
 290 295 300

Gln Ile Trp Ser Cys Leu Thr Gln Lys Glu Glu Leu Glu Leu Val Ala
 305 310 315 320

Arg Ser Ile Arg Gln Lys Leu His Glu Asn Ser Asp Leu Ser Tyr Lys
 325 330 335

His Phe Arg Ile Leu Leu Gly Asp Val Ala Ser Tyr Gln Leu Ser Leu
 340 345 350

Lys Thr Ile Phe Asp Gln Tyr Gln Ile Pro Phe Tyr Leu Gly Arg Ser
 355 360 365

Glu Ala Met Ala His His Pro Leu Thr Gln Phe Val Glu Ser Ile Leu
 370 375 380

Ala Leu Lys Arg Tyr Arg Phe Arg Gln Glu Asp Leu Ile Asn Leu Leu
 385 390 395 400

Arg Thr Asp Leu Tyr Thr Asp Leu Ser Gln Ser Asp Ile Asp Ala Phe
 405 410 415

Glu Gln Tyr Ile Arg Tyr Leu Gly Ile Asn Gly Leu Pro Ala Phe Gln
 420 425 430

Gln Thr Phe Thr Lys Ser His His Gly Lys Phe Asn Leu Glu Arg Leu
 435 440 445

00969787 01360
 1093310 28269260

Pro Ser Leu Phe Asn Glu Ser Glu Ser Lys Glu Ser Ala Tyr Leu Gln
645 650 655

Glu	Leu	Ile	His	Phe	Gly	Phe	Arg	Arg	Arg	Glu	Lys	Arg	Met	Asn	His
660				665				670							
Lys	Gly	Leu	Ser	Lys	Glu	Asp	Met	Gly	Ser	Tyr	His	Ser	Leu	Leu	Ser
675				680				685							
Ser	Leu	Val	Ala	Tyr	His	Gln	Gln	Gly	Glu	Met	Ser	Asp	Thr	Glu	Gln
690				695				700							
Asp	Leu	Thr	Phe	Val	Lys	Val	Leu	Ser	Arg	Val	Ile	Gly	Lys	Lys	Leu
705				710				715				720			
Asp	Gln	Gln	Gly	Leu	Glu	Asn	Pro	Ala	Ile	Pro	Thr	Ser	Pro	Ser	Ser
725				730				735							
Lys	Thr	Leu	Ala	Lys	Asp	Thr	Leu	Gln	Ala	Leu	Tyr	Pro	Ala	Lys	Gln
740				745				750							
Glu	Phe	Tyr	Leu	Ser	Thr	Ser	Gly	Leu	Thr	Glu	Phe	Tyr	Arg	Asn	Glu
755				760				765							
Tyr	Ser	Tyr	Phe	Leu	Arg	Tyr	Val	Leu	Gly	Leu	Gln	Glu	Glu	Leu	Arg
770				775				780							
Leu	His	Pro	Asp	Ala	Arg	Ser	His	Gly	Asn	Phe	Leu	His	Arg	Ile	Phe
785				790				795				800			
Glu	Arg	Ala	Leu	Gln	Leu	Pro	Asn	Glu	Asp	Ser	Phe	Asp	Gln	Arg	Leu
805				810				815							
Glu	Gln	Ala	Ile	Gln	Glu	Thr	Ser	Gln	Glu	Arg	Glu	Phe	Glu	Ala	Ile
820				825				830							
Tyr	Gln	Glu	Ser	Leu	Glu	Ala	Gln	Phe	Thr	Lys	Glu	Val	Leu	Leu	Asp
835				840				845							
Val	Ala	Arg	Thr	Thr	Gly	His	Ile	Leu	Arg	His	Asn	Pro	Ala	Ile	Glu
850				855				860							

Asp Leu Ala Asp Gly Lys Arg Leu Val Gly Glu Lys Leu Lys Gln Ala

1075

1080

1085

Trp Leu Glu Lys Ile Arg Glu Glu Leu Asn Arg

1090

1095

<210> 12

<211> 1216

<212> PRT

<213> Streptococcus pneumoniae

<400> 12

Met Lys Leu Ile Pro Phe Leu Ser Glu Glu Glu Ile Gln Lys Leu Gln

1

5

10

15

Glu Ala Glu Ala Asn Ser Ser Lys Glu Gln Lys Lys Thr Ala Glu Gln

20

25

30

Ile Glu Ala Ile Tyr Thr Ser Ala Gln Asn Ile Leu Val Ser Ala Ser

35

40

45

Ala Gly Ser Gly Lys Thr Phe Val Met Ala Glu Arg Ile Leu Asp Gln

50

55

60

Leu Ala Arg Gly Val Glu Ile Ser Gln Leu Phe Ile Ser Thr Phe Thr

65

70

75

80

Val Lys Ala Ala Thr Glu Leu Lys Glu Arg Leu Glu Lys Lys Ile Ser

85

90

95

Lys Lys Ile Gln Glu Thr Asp Asp Val Asp Leu Lys Gln His Leu Gly

100

105

110

Arg Gln Leu Ala Asp Leu Pro Asn Ala Ala Ile Gly Thr Met Asp Ser

115

120

125

1095101326360

Lys Leu Gly Gln Leu Ser Asp Gln Ile Ala Ile Leu Asp Tyr Gln Glu
340 345 350

Arg Tyr His Gly Asp Thr Trp Lys Leu Ala Lys Thr Phe Gln Ser Phe
355 360 365

Met Ser Asp Phe Val Glu Ala Tyr Arg Gln Arg Lys Arg Gln Glu Asn
370 375 380

Ala Phe Glu Phe Ala Asp Ile Ser His Tyr Thr Ile Glu Ile Leu Glu
385 390 395 400

Asn Phe Pro Gln Val Arg Glu Ser Tyr Gln Glu Arg Phe His Glu Val
405 410 415

Met Val Asp Glu Tyr Gln Asp Thr Asn His Ile Gln Glu Arg Met Leu
420 425 430

Glu Leu Leu Ser Asn Gly His Asn Arg Phe Met Val Gly Asp Ile Lys
435 440 445

Gln Ser Ile Tyr Arg Phe Arg Gln Ala Asp Pro Gln Ile Phe Asn Glu
450 455 460

Lys Phe Gln Arg Tyr Ala Gln Asn Pro Gln Glu Gly Arg Leu Ile Ile
465 470 475 480

Leu Lys Glu Asn Phe Arg Ser Ser Ser Glu Val Leu Ser Ala Thr Asn
485 490 495

Asp Val Phe Glu Arg Leu Met Asp Gln Glu Val Gly Glu Ile Asn Tyr
500 505 510

Asp Asn Lys His Gln Leu Val Phe Ala Asn Thr Lys Leu Thr Pro Asn
515 520 525

Pro Asp Asn Lys Ala Ala Phe Leu Leu Tyr Asp Lys Asp Asp Thr Gly
530 535 540

105210 1626360

Asp Gln Phe Glu Lys Ser Asn Phe Lys Gly Leu Ser Arg Phe Ile Arg
 755 760 765

Met Ile Asp Gln Val Leu Glu Ala Gln His Asp Leu Ala Ser Val Ala
 770 775 780

Val Ala Pro Pro Lys Asp Ala Val Glu Leu Met Thr Ile His Lys Ser
 785 790 795 800

Lys Gly Leu Glu Phe Pro Tyr Val Phe Ile Leu Asn Met Asp Gln Asp
 805 810 815

Phe Asn Lys Gln Asp Ser Met Ser Glu Val Ile Leu Ser Arg Gln Asn
 820 825 830

Gly Leu Gly Val Lys Tyr Ile Ala Lys Met Glu Thr Gly Ala Val Glu
 835 840 845

Asp His Tyr Pro Lys Thr Ile Lys Leu Ser Ile Pro Ser Leu Thr Tyr
 850 855 860

Arg Gln Asn Glu Glu Glu Leu Gln Leu Ala Ser Tyr Ser Glu Gln Met
 865 870 875 880

Arg Leu Leu Tyr Val Ala Met Thr Arg Ala Glu Lys Lys Leu Tyr Leu
 885 890 895

Val Gly Lys Gly Ser Arg Glu Lys Leu Glu Ser Lys Glu Tyr Pro Ala
 900 905 910

Ala Lys Asn Gly Lys Leu Asn Ser Asn Thr Arg Leu Gln Ala Arg Asn
 915 920 925

Phe Gln Asp Trp Leu Trp Ala Ile Ser Lys Val Phe Thr Lys Asp Lys
 930 935 940

Leu Asn Phe Ser Tyr Arg Phe Ile Gly Glu Asp Gln Leu Thr Arg Glu
 945 950 955 960

FOUO 2326260

Tyr Asp Glu Pro Ser Gln Leu Val Asp Arg Tyr Arg Gly Gln Leu Ala
 1170 1175 1180

Leu Tyr Glu Glu Ala Leu Ser Arg Ala Tyr Ser Ile Glu Asn Ile Glu
 1185 1190 1195 1200

Lys Tyr Leu Ile Leu Leu Gly Lys Asp Glu Val Gln Val Val Lys Val
 1205 1210 1215

<210> 13

<211> 215

<212> PRT

<213> Streptococcus pneumoniae

<400> 13

Met Glu Leu Ala Arg His Ala Glu Ser Leu Gly Val Asp Ala Ile Ala
 1 5 10 15

Thr Ile Pro Pro Ile Tyr Phe Arg Leu Pro Glu Tyr Ser Val Ala Lys
 20 25 30

Tyr Trp Asn Asp Ile Ser Ser Ala Ala Pro Asn Thr Asp Tyr Val Ile
 35 40 45

Tyr Asn Ile Pro Gln Leu Ala Gly Val Ala Leu Thr Pro Ser Leu Tyr
 50 55 60

Thr Glu Met Leu Lys Asn Pro Arg Val Ile Gly Val Lys Asn Ser Ser
 65 70 75 80

Met Pro Val Gln Asp Ile Gln Thr Phe Val Ser Leu Gly Gly Glu Asp
 85 90 95

103210 232320

43

His Ile Val Phe Asn Gly Pro Asp Glu Gln Phe Leu Gly Gly Arg Leu
100 105 110

Met Gly Ala Arg Ala Gly Ile Gly Gly Thr Tyr Gly Ala Met Pro Glu
115 120 125

Leu Phe Leu Lys Leu Asn Gln Leu Ile Ala Asp Lys Asp Leu Glu Thr
130 135 140

Ala Arg Glu Leu Gln Tyr Ala Ile Asn Ala Ile Ile Gly Lys Leu Thr
145 150 155 160

Ser Ala His Gly Asn Met Tyr Gly Val Ile Lys Glu Val Leu Lys Ile
165 170 175

Asn Glu Gly Leu Asn Ile Gly Ser Val Arg Ser Pro Leu Thr Pro Val
180 185 190

Thr Glu Glu Asp Arg Pro Val Val Glu Ala Ala Ala Ala Leu Ile Arg
195 200 205

Glu Thr Lys Glu Arg Phe Leu
210 215

<210> 14

<211> 407

<212> PRT

<213> Streptococcus pneumoniae

<400> 14

Met Tyr Lys Thr Lys Cys Leu Arg Glu Lys Leu Val Leu Phe Leu Lys
1 5 10 15

Ile Phe Phe Pro Ile Leu Ile Tyr Gln Phe Ala Asn Tyr Ser Ala Ser
20 25 30

103210 2325200

45

Val Arg Leu Gly Leu Pro Ile Gly Gly Thr Val Phe Ala Glu Val Ala
245 250 255

Ile Phe Ser Val Val Gly Leu Ile Met Ala Lys Phe Ser Pro Leu Ile
260 265 270

Ile Ala Ser His Gln Ser Ala Met Asn Phe Ser Ser Leu Met Tyr Ala
275 280 285

Phe Pro Met Ser Ile Ser Ser Ala Met Ala Ile Val Val Ser Tyr Glu
290 295 300

Val Gly Ala Lys Arg Phe Asp Asp Ala Lys Thr Tyr Ile Gly Leu Gly
305 310 315 320

Arg Trp Thr Ala Leu Ile Phe Ala Ala Phe Thr Leu Thr Phe Leu Tyr
325 330 335

Ile Phe Arg Gly Asn Val Ala Ser Leu Tyr Gly Asn Asp Pro Lys Phe
340 345 350

Ile Asp Leu Thr Val Arg Phe Leu Thr Tyr Ser Leu Phe Phe Gln Leu
355 360 365

Ala Asp Thr Phe Ala Ala Pro Leu Gln Gly Ile Leu Arg Gly Tyr Lys
370 375 380

Asp Thr Val Ile Pro Phe Tyr Leu Gly Leu Leu Gly Tyr Trp Gly Val
385 390 395 400

Ala Ile Pro Val Tyr Ala Ile
405

105610-66360

<210> 15

<211> 189

<212> PRT

<213> Streptococcus pneumoniae

<400> 15

Met Ser Thr Leu Ala Lys Ile Glu Ala Leu Leu Phe Val Ala Gly Glu

1 5 10 15

Asp Gly Ile Arg Val Arg Gln Leu Ala Glu Leu Leu Ser Leu Pro Pro

20 25 30

Thr Gly Ile Gln Gln Ser Leu Gly Lys Leu Ala Gln Lys Tyr Glu Lys

35 40 45

Asp Pro Asp Ser Ser Leu Ala Leu Ile Glu Thr Ser Gly Ala Tyr Arg

50 55 60

Leu Val Thr Lys Pro Gln Phe Ala Glu Ile Leu Lys Glu Tyr Ser Lys

65 70 75 80

Ala Pro Ile Asn Gln Ser Leu Ser Arg Ala Ala Leu Glu Thr Leu Ser

85 90 95

Ile Ile Ala Tyr Lys Gln Pro Ile Thr Arg Ile Glu Ile Asp Ala Ile

100 105 110

Arg Gly Val Asn Ser Ser Gly Ala Leu Ala Lys Leu Gln Ala Phe Asp

115 120 125

Leu Ile Lys Glu Asp Gly Lys Lys Glu Val Leu Gly Arg Pro Asn Leu

130 135 140

Tyr Val Thr Thr Asp Tyr Phe Leu Asp Tyr Met Gly Ile Asn His Leu

145 150 155 160

Glu Glu Leu Pro Val Ile Asp Glu Leu Glu Ile Gln Ala Gln Glu Ser

165 170 175

P03611 2629260

Gln Leu Phe Gly Glu Arg Ile Glu Glu Asp Glu Asn Gln
 180 185

<210> 16

<211> 311

<212> PRT

<213> Streptococcus pneumoniae

<400> 16

Met Asp Thr Met Ile Ser Arg Phe Phe Arg His Leu Phe Glu Ala Leu
 1 5 10 15

Lys Ser Leu Lys Arg Asn Gly Trp Met Thr Val Ala Ala Val Ser Ser
 20 25 30

Val Met Ile Thr Leu Thr Leu Val Ala Ile Phe Ala Ser Val Ile Phe
 35 40 45

Asn Thr Ala Lys Leu Ala Thr Asp Ile Glu Asn Asn Val Arg Val Val
 50 55 60

Val Tyr Ile Arg Lys Asp Val Glu Asp Asn Ser Gln Thr Ile Glu Lys
 65 70 75 80

Glu Gly Gln Thr Val Thr Asn Asn Asp Tyr His Lys Val Tyr Asp Ser
 85 90 95

Leu Lys Asn Met Ser Thr Val Lys Ser Val Thr Phe Ser Ser Lys Glu
 100 105 110

Glu Gln Tyr Glu Lys Leu Thr Glu Ile Met Gly Asp Asn Trp Lys Ile
 115 120 125

Phe Glu Gly Asp Ala Asn Pro Leu Tyr Asp Ala Tyr Ile Val Glu Ala
 130 135 140

103210 23263260

Asn Thr Pro Asn Asp Val Lys Thr Ile Ala Glu Asp Ala Lys Lys Ile
 145 150 155 160

Glu Gly Val Ser Glu Val Gln Asp Gly Gly Ala Asn Thr Glu Arg Leu
 165 170 175

Phe Lys Leu Ala Ser Phe Ile Arg Val Trp Gly Leu Gly Ile Ala Ala
 180 185 190

Leu Leu Ile Phe Ile Ala Val Phe Leu Ile Ser Asn Thr Ile Arg Ile
 195 200 205

Thr Ile Ile Ser Arg Ser Arg Glu Ile Gln Ile Met Arg Leu Val Gly
 210 215 220

Ala Lys Asn Ser Tyr Ile Arg Gly Pro Phe Leu Leu Glu Gly Ala Phe
 225 230 235 240

Ile Gly Leu Leu Gly Ala Ile Ala Pro Ser Val Leu Val Phe Ile Val
 245 250 255

Tyr Gln Ile Val Tyr Gln Ser Val Asn Lys Ser Leu Val Gly Gln Asn
 260 265 270

Leu Ser Met Ile Ser Pro Asp Leu Phe Ser Pro Leu Met Ile Ala Leu
 275 280 285

Leu Phe Val Ile Gly Val Phe Ile Gly Ser Leu Gly Ser Gly Ile Ser
 290 295 300

Met Arg Arg Phe Leu Lys Ile
 305 310

115610 262560

<210> 17

<211> 658

<212> PRT

<213> Streptococcus pneumoniae

<400> 17

Met Lys Lys Val Arg Phe Ile Phe Leu Ala Leu Leu Phe Phe Leu Ala

1

5

10

15

Ser Pro Glu Gly Ala Met Ala Ser Asp Gly Thr Trp Gln Gly Lys Gln

20

25

30

Tyr Leu Lys Glu Asp Gly Ser Gln Ala Ala Asn Glu Trp Val Phe Asp

35

40

45

Thr His Tyr Gln Ser Trp Phe Tyr Ile Lys Ala Asp Ala Asn Tyr Ala

50

55

60

Glu Asn Glu Trp Leu Lys Gln Gly Asp Asp Tyr Phe Tyr Leu Lys Ser

65

70

75

80

Gly Gly Tyr Met Ala Lys Ser Glu Trp Val Glu Asp Lys Gly Ala Phe

85

90

95

Tyr Tyr Leu Asp Gln Asp Gly Lys Met Lys Arg Asn Ala Trp Val Gly

100

105

110

Thr Ser Tyr Val Gly Ala Thr Gly Ala Lys Val Ile Glu Asp Trp Val

115

120

125

Tyr Asp Ser Gln Tyr Asp Ala Trp Phe Tyr Ile Lys Ala Asp Gly Gln

130

135

140

His Ala Glu Lys Glu Trp Leu Gln Ile Lys Gly Lys Asp Tyr Tyr Phe

145

150

155

160

Lys Ser Gly Gly Tyr Leu Leu Thr Ser Gln Trp Ile Asn Gln Ala Tyr

165

170

175

109210-2869400

Val Asn Ala Ser Gly Ala Lys Val Gln Gln Gly Trp Leu Phe Asp Lys
 180 185 190

Gln Tyr Gln Ser Trp Phe Tyr Ile Lys Glu Asn Gly Asn Tyr Ala Asp
 195 200 205

Lys Glu Trp Ile Phe Glu Asn Gly His Tyr Tyr Tyr Leu Lys Ser Gly
 210 215 220

Gly Tyr Met Ala Ala Asn Glu Trp Ile Trp Asp Lys Glu Ser Trp Phe
 225 230 235 240

Tyr Leu Lys Phe Asp Gly Lys Met Ala Glu Lys Glu Trp Val Tyr Asp
 245 250 255

Ser His Ser Gln Ala Trp Tyr Tyr Phe Lys Ser Gly Gly Tyr Met Thr
 260 265 270

Ala Asn Glu Trp Ile Trp Asp Lys Glu Ser Trp Phe Tyr Leu Lys Ser
 275 280 285

Asp Gly Lys Ile Ala Glu Lys Glu Trp Val Tyr Asp Ser His Ser Gln
 290 295 300

Ala Trp Tyr Tyr Phe Lys Ser Gly Gly Tyr Met Thr Ala Asn Glu Trp
 305 310 315 320

Ile Trp Asp Lys Glu Ser Trp Phe Tyr Leu Lys Ser Asp Gly Lys Ile
 325 330 335

Ala Glu Lys Glu Trp Val Tyr Asp Ser His Ser Gln Ala Trp Tyr Tyr
 340 345 350

Phe Lys Ser Gly Gly Tyr Met Ala Lys Asn Glu Thr Val Asp Gly Tyr
 355 360 365

Gln Leu Gly Ser Asp Gly Lys Trp Leu Gly Gly Lys Thr Thr Asn Glu
 370 375 380

00769787-012604

Asn Asn Phe Phe Gly Ile Thr Ala Tyr Asp Thr Thr Pro Tyr Leu Ser
580 585 590

Ala Lys Thr Phe Asp Asp Val Asp Lys Gly Ile Leu Gly Ala Thr Lys
 595 600 605

Trp Ile Lys Glu Asn Tyr Ile Asp Arg Gly Arg Thr Phe Leu Gly Asn
 610 615 620

Lys Ala Ser Gly Met Asn Val Glu Tyr Ala Ser Asp Pro Tyr Trp Gly
 625 630 635 640

Glu Lys Ile Ala Ser Val Met Met Lys Ile Asn Glu Lys Leu Gly Gly
 645 650 655

Lys Asp

<210> 18

<211> 288

<212> PRT

<213> Streptococcus pneumoniae

<400> 18

Met Lys Lys Val Leu Gln Lys Tyr Trp Ala Trp Ala Phe Val Val Ile
 1 5 10 15

Pro Leu Leu Leu Gln Ala Ile Phe Phe Tyr Val Pro Met Phe Gln Gly
 20 25 30

Ala Phe Tyr Ser Phe Thr Asn Trp Thr Gly Leu Thr Tyr Asn Tyr Lys
 35 40 45

Phe Val Gly Leu Asn Asn Phe Lys Leu Leu Phe Met Asp Pro Lys Phe
 50 55 60

Met Asn Ala Ile Gly Phe Thr Ala Ile Ile Ala Ile Ala Met Val Val
 65 70 75 80

Gly Glu Ile Ala Leu Gly Ile Phe Ile Ala Arg Val Leu Asn Ser Lys
 85 90 95

00569797 043604

Ile Lys Gly Gln Thr Phe Phe Arg Ala Trp Phe Phe Phe Pro Ala Val
 100 105 110

Leu Ser Gly Leu Thr Val Ala Leu Ile Phe Lys Gln Val Phe Asn Tyr
 115 120 125

Gly Leu Pro Ala Ile Gly Asn Ala Leu His Ile Glu Phe Phe Gln Thr
 130 135 140

Ser Leu Leu Gly Thr Lys Trp Gly Ala Ile Phe Ala Ala Val Phe Val
 145 150 155 160

Leu Leu Trp Gln Gly Val Ala Met Pro Ile Ile Ile Phe Leu Ala Gly
 165 170 175

Leu Gln Ser Ile Pro Thr Glu Ile Thr Glu Ala Ala Arg Ile Asp Gly
 180 185 190

Ala Thr Ser Lys Gln Val Phe Trp Asn Ile Glu Leu Pro Tyr Leu Leu
 195 200 205

Pro Ser Val Ser Met Val Phe Ile Leu Ala Leu Lys Gly Gly Leu Thr
 210 215 220

Ala Phe Asp Gln Val Phe Ala Met Thr Gly Gly Gly Pro Asn Asn Ala
 225 230 235 240

Thr Thr Ser Leu Gly Leu Leu Val Tyr Asn Tyr Ala Phe Lys Asn Asn
 245 250 255

Gln Phe Gly Tyr Ala Asn Ala Ile Ala Val Ile Leu Phe Phe Leu Ile
 260 265 270

Val Val Ile Ser Ile Ile Gln Leu Arg Val Ser Lys Lys Phe Glu Ile
 275 280 285

003697043601

<213> Streptococcus pneumoniae

Met Met Lys Gln Asp Glu Arg Lys Ala Leu Ile Gly Lys Tyr Ile Leu
1 5 10 15

Leu Ile Leu Gly Ser Val Leu Ile Leu Val Pro Leu Leu Ala Thr Leu
20 25 30

Phe Ser Ser Phe Lys Pro Thr Lys Asp Ile Val Asp Asn Phe Phe Gly
35 40 45

Phe Pro Thr Asn Phe Thr Trp Asp Asn Phe Ser Arg Leu Leu Ala Asp
50 55 60

Gly Ile Gly Gly Tyr Tyr Trp Asn Ser Val Val Ile Thr Val Leu Ser
65 70 75 80

Leu Leu Ala Val Met Ile Phe Ile Pro Met Ala Ala Tyr Ser Ile Ala
85 90 95

Arg Asn Met Ser Lys Arg Lys Ala Phe Thr Ile Met Tyr Thr Leu Leu
100 105 110

Ile Leu Gly Ile Phe Val Pro Phe Gln Val Ile Met Ile Pro Ile Thr
115 120 125

Val Met Met Ser Lys Leu Gly Leu Ala Asn Thr Phe Gly Leu Ile Leu
130 135 140

L u Tyr Leu Thr Tyr Ala Ile Pro Gln Thr Leu Phe Leu Tyr Val Gly
145 150 155 160

55

Tyr Ile Lys Ile Ser Ile Pro Glu Ser Leu Asp Glu Ala Ala Glu Ile
165 170 175

Asp Gly Ala Asn Gln Phe Thr Thr Tyr Phe Arg Ile Ile Phe Pro Met
180 185 190

Met Lys Pro Met His Ala Thr Thr Met Ile Ile Asn Ala Leu Trp Phe
195 200 205

Trp Asn Asp Phe Met Leu Pro Leu Leu Val Leu Asn Arg Asp Ser Lys
210 215 220

Met Trp Thr Leu Pro Leu Phe Gln Tyr Asn Tyr Ala Gly Gln Tyr Phe
225 230 235 240

Asn Asp Tyr Gly Pro Ser Phe Ala Ser Tyr Val Val Gly Ile Ile Ser
245 250 255

Ile Thr Ile Val Tyr Leu Phe Phe Gln Arg His Ile Ile Ser Gly Met
260 265 270

Ser Asn Gly Ala Val Lys
275

<210> 20

<211> 347

<212> PRT

<213> Streptococcus pneumoniae

<400> 20

Met Lys Ser Ile Leu Gln Lys Met Gly Glu His Pro Met Leu Leu Leu
1 5 10 15

Phe Leu Ser Tyr Ser Thr Val Ile Ser Ile Leu Ala Gln Asn Trp Met
20 25 30

Gly Leu Val Ala Ser Val Gly Met Phe Leu Phe Thr Ile Phe Phe Leu
 35 40 45

His Tyr Gln Ser Ile Leu Ser His Lys Phe Phe Arg Leu Ile Leu Gln
 50 55 60

Phe Val Leu Phe Gly Ser Val Leu Ser Ala Ala Phe Ala Ser Leu Glu
 65 70 75 80

His Phe Gln Ile Val Lys Lys Phe Asn Tyr Ala Phe Leu Ser Pro Asn
 85 90 95

Met Gln Val Trp His Gln Asn Arg Ala Glu Val Thr Phe Phe Asn Pro
 100 105 110

Asn Tyr Tyr Gly Ile Ile Cys Cys Phe Cys Ile Met Ile Ala Phe Tyr
 115 120 125

Leu Phe Thr Thr Thr Lys Leu Asn Trp Leu Lys Val Phe Cys Val Ile
 130 135 140

Ala Gly Phe Val Asn Leu Phe Gly Leu Asn Phe Thr Gln Asn Arg Thr
 145 150 155 160

Ala Phe Pro Ala Ile Ile Ala Gly Ala Ile Ile Tyr Leu Phe Thr Thr
 165 170 175

Ile Lys Asn Trp Lys Ala Phe Trp Leu Ser Ile Gly Val Phe Ala Ile
 180 185 190

Gly Leu Ser Phe Leu Phe Ser Ser Asp Leu Gly Val Arg Met Gly Thr
 195 200 205

Leu Asp Ser Ser Met Glu Glu Arg Ile Ser Ile Trp Asp Ala Gly Met
 210 215 220

Ala Leu Phe Lys Gln Asn Pro Phe Trp Gly Glu Gly Pro Leu Thr Tyr
 225 230 235 240

00369767 042604

Glu His Arg Met Leu Val Ser Asp Met Thr Asp
340 345

<210> 21

<211> .432

<212> PRT

<213> Streptococcus pneumoniae

<400> 21

Met Ser Lys Met Asp Val Gln Lys Ile Ile Ala Pro Met Met Lys Phe
1. 5 10 15

Val Asn Met Arg Gly Ile Ile Ala Leu Lys Asp Gly Met Leu Ala Ile
20 25 30

Leu Pro Leu Thr Val Val Gly Ser Leu Phe Leu Ile Met Gly Gln Leu
35 40 45

[illegible]

Trp Trp Phe Gly Val His Gly Gln Ser Val Val Asn Gly Val Val Thr
245 250 255

Phe Lys Val Gln Asp Arg Leu Ala Tyr Gln Asn Glu Ile Lys Gln Ser
420 425 430

<213> Streptococcus pneumoniae

Met Lys Lys Lys Asp Leu Val Asp Gln Leu Val Ser Glu Ile Glu Thr
1 5 10 15

Gly Lys Val Arg Thr Leu Gly Ile Tyr Gly His Gly Ala Ser Gly Lys
20 25 30

Ser Thr Phe Ala Gln Glu Leu Tyr Gln Ala Leu Asp Ser Thr Thr Val
35 40 45

Asn Leu Leu Glu Thr Asp Pro Tyr Ile Thr Ser Gly Arg His Leu Val
50 55 60

Val Pro Lys Asp Ala Pro Asn Gln Lys Val Thr Ala Ser Leu Pro Val
65 70 75 80

Ala His Glu Leu Glu Ser Leu Gln Arg Asp Ile Leu Ala Cys Arg Arg
85 90 95

Val Trp Met Ser
100

<213> Streptococcus pneumoniae

Met Lys Lys Arg Tyr Leu Val Leu Thr Ala Leu Leu Ala Leu Ser Leu
1 5 10 15

Ala Ala Cys Ser Gln Glu Lys Thr Lys Asn Glu Asp Gly Glu Thr Lys
 20 25 30

Thr Glu Gln Thr Ala Lys Ala Asp Gly Thr Val Gly Ser Lys Ser Gln
 35 40 45

Gly Ala Ala Gln Lys Lys Ala Glu Val Val Asn Lys Gly Asp Tyr Tyr
 50 55 60

Ser Ile Gln Gly Lys Tyr Asp Glu Ile Ile Val Ala Asn Lys His Tyr
 65 70 75 80

Pro Leu Ser Lys Asp Tyr Asn Pro Gly Glu Asn Pro Thr Ala Lys Ala
 85 90 95

Glu Leu Val Lys Leu Ile Lys Ala Met Gln Glu Ala Gly Phe Pro Ile
 100 105 110

Ser Asp His Tyr Ser Gly Phe Arg Ser Tyr Glu Thr Gln Thr Lys Leu
 115 120 125

Tyr Gln Asp Tyr Val Asn Gln Asp Gly Lys Ala Ala Ala Asp Arg Tyr
 130 135 140

Ser Ala Arg Pro Gly Tyr Ser Glu His Gln Thr Gly Leu Ala Phe Asp
 145 150 155 160

Val Ile Gly Thr Asp Gly Asp Leu Val Thr Glu Glu Lys Ala Ala Gln
 165 170 175

Trp Leu Leu Asp His Ala Ala Asp Tyr Gly Phe Val Val Arg Tyr Leu
 180 185 190

Lys Gly Lys Glu Lys Glu Thr Gly Tyr Met Ala Glu Glu Trp His Leu
 195 200 205

Arg Tyr Val Gly Lys Glu Ala Lys Glu Ile Ala Ala Ser Gly Leu Ser
 210 215 220

009769787 042604

Leu Glu Glu Tyr Tyr Gly Phe Glu Gly Gly Asp Tyr Val Asp
 225 230 235

<210> 24

<211> 425

<212> PRT

<213> Streptococcus pneumoniae

<400> 24

Met Arg Glu Pro Asp Phe Leu Asn His Phe Leu Lys Lys Gly Tyr Phe
 1 5 10 15

Lys Lys His Ala Lys Ala Val Leu Ala Leu Ser Gly Gly Leu Asp Ser
 20 25 30

Met Phe Leu Phe Lys Val Leu Ser Thr Tyr Gln Lys Glu Leu Glu Ile
 35 40 45

Glu Leu Ile Leu Ala His Val Asn His Lys Gln Arg Ile Glu Ser Asp
 50 55 60

Trp Glu Glu Lys Glu Leu Arg Lys Leu Ala Ala Glu Ala Glu Leu Pro
 65 70 75 80

Ile Tyr Ile Ser Asn Phe Ser Gly Glu Phe Ser Glu Ala Arg Ala Arg
 85 90 95

Asn Phe Arg Tyr Asp Phe Phe Gln Glu Val Met Lys Lys Thr Gly Ala
 100 105 110

Thr Ala Leu Val Thr Ala His His Ala Asp Asp Gln Val Glu Thr Ile
 115 120 125

Phe Met Arg L u Ile Arg Gly Thr Arg Leu Arg Tyr Leu Ser Gly Ile
 130 135 140

009387-012601

Lys Glu Lys Gln Val Val Gly Glu Ile Glu Ile Ile Arg Pro Phe Leu
 145 150 155 160

His Phe Gln Lys Lys Asp Phe Pro Ser Ile Phe His Phe Glu Asp Thr
 165 170 175

Ser Asn Gln Glu Asn His Tyr Phe Arg Asn Arg Ile Arg Asn Ser Tyr
 180 185 190

Leu Pro Glu Leu Glu Lys Glu Asn Pro Arg Phe Arg Asp Ala Ile Leu
 195 200 205

Gly Ile Gly Asn Glu Ile Leu Asp Tyr Asp Leu Ala Ile Ala Glu Leu
 210 215 220

Ser Asn Asn Ile Asn Val Glu Asp Leu Gln Gln Leu Phe Ser Tyr Ser
 225 230 235 240

Glu Ser Thr Gln Arg Val Leu Leu Gln Thr Tyr Leu Asn Arg Phe Pro
 245 250 255

Asp Leu Asn Leu Thr Lys Ala Gln Phe Ala Glu Val Gln Gln Ile Leu
 260 265 270

Lys Ser Lys Ser Gln Tyr Arg His Pro Ile Lys Asn Gly Tyr Glu Leu
 275 280 285

Ile Lys Glu Tyr Gln Gln Phe Gln Ile Cys Lys Ile Ser Pro Gln Ala
 290 295 300

Asp Glu Lys Glu Asp Glu Leu Val Leu His Tyr Gln Asn Gln Val Ala
 305 310 315 320

Tyr Gln Gly Tyr Leu Phe Ser Phe Gly Leu Pro Leu Glu Gly Glu Leu
 325 330 335

Ile Gln Gln Ile Pro Val Ser Arg Glu Thr Ser Ile His Ile Arg His
 340 345 350

0060767 01301
 10510 2525250

Arg Lys Thr Gly Asp Val Leu Ile Lys Asn Gly His Arg Lys Lys Leu
 355 360 365

Arg Arg Leu Phe Ile Asp Leu Lys Ile Pro Met Glu Lys Arg Asn Ser
 370 375 380

Ala Leu Ile Ile Glu Gln Phe Gly Glu Ile Val Ser Ile Leu Gly Ile
 385 390 395 400

Ala Thr Asn Asn Leu Ser Lys Lys Thr Lys Asn Asp Ile Met Asn Thr
 405 410 415

Val Leu Tyr Ile Glu Lys Ile Asp Arg
 420 425

<210> 25

<211> 422

<212> PRT

<213> Streptococcus pneumoniae

<400> 25

Met Arg Lys Phe Leu Ile Ile Leu Leu Leu Pro Ser Phe Leu Thr Ile
 1 5 10 15

Ser Lys Val Val Ser Thr Glu Lys Glu Val Val Tyr Thr Ser Lys Glu
 20 25 30

Ile Tyr Tyr Leu Ser Gln Ser Asp Phe Gly Ile Tyr Phe Arg Glu Lys
 35 40 45

Leu Ser Ser Pro Met Val Tyr Gly Glu Val Pro Val Tyr Ala Asn Glu
 50 55 60

Asp Leu Val Val Glu Ser Gly Lys Leu Thr Pro Lys Thr Ser Phe Gln
 65 70 75 80

00960787 0 13604

65

Ile Thr Glu Trp Arg Leu Asn Lys Gln Gly Ile Pro Val Phe Lys Leu
85 90 95

Ser Asn His Gln Phe Ile Ala Ala Asp Lys Arg Phe Leu Tyr Asp Gln
100 105 110

Ser Glu Val Thr Pro Thr Ile Lys Lys Val Trp Leu Glu Ser Asp Phe
115 120 125

Lys Leu Tyr Asn Ser Pro Tyr Asp Leu Lys Glu Val Lys Ser Ser Leu
130 135 140

Ser Ala Tyr Ser Gln Val Ser Ile Asp Lys Thr Met Phe Val Glu Gly
145 150 155 160

Arg Glu Phe Leu His Ile Asp Gln Ala Gly Trp Val Ala Lys Glu Ser
165 170 175

Thr Ser Glu Glu Asp Asn Arg Met Ser Lys Val Gln Glu Met Leu Ser
180 185 190

Glu Lys Tyr Gln Lys Asp Ser Phe Ser Ile Tyr Val Lys Gln Leu Thr
195 200 205

Thr Gly Lys Glu Ala Gly Ile Asn Gln Asp Glu Lys Met Tyr Ala Ala
210 215 220

Ser Val Leu Lys Leu Ser Tyr Leu Tyr Tyr Thr Gln Glu Lys Ile Asn
225 230 235 240

Glu Gly Leu Tyr Gln Leu Asp Thr Thr Val Lys Tyr Val Ser Ala Val
245 250 255

Asn Asp Phe Pro Gly Ser Tyr Lys Pro Glu Gly Ser Gly Ser Leu Pro
260 265 270

Lys Lys Glu Asp Asn Lys Glu Tyr Ser Leu Lys Asp Leu Ile Thr Lys
275 280 285

00760707 04504

Val Ser Lys Glu Ser Asp Asn Val Ala His Asn Leu Leu Gly Tyr Tyr
290 295 300

Ile Ser Asn Gln Ser Asp Ala Thr Phe Lys Ser Lys Met Ser Ala Ile
305 310 315 320

Met Gly Asp Asp Trp Asp Pro Lys Glu Lys Leu Ile Ser Ser Lys Met
325 330 335

Ala Gly Lys Phe Met Glu Ala Ile Tyr Asn Gln Asn Gly Phe Val Leu
340 345 350

Glu Ser Leu Thr Lys Thr Asp Phe Asp Ser Gln Arg Ile Ala Lys Gly
355 360 365

Val Ser Val Lys Val Ala His Lys Ile Gly Asp Ala Asp Glu Phe Lys
370 375 380

His Asp Thr Gly Val Val Tyr Ala Asp Ser Pro Phe Ile Leu Ser Ile
385 390 395 400

Phe Thr Lys Asn Ser Asp Tyr Asp Thr Ile Ser Lys Ile Ala Lys Asp
405 410 415

Val Tyr Glu Val Leu Lys
420

<210> 26

<211> 652

<212> PRT

<213> Streptococcus pneumoniae

<400> 26

Met Lys Lys Gln Asn Asn Gly Leu Ile Lys Asn Pro Phe Leu Trp Leu

1

5

10

15

00759787-03604

Leu Phe Ile Phe Phe Leu Val Thr Gly Phe Gln Tyr Phe Tyr Ser Gly
20 25 30

Asn Asn Ser Gly Gly Ser Gln Gln Ile Asn Tyr Thr Glu Leu Val Gln
35 40 45

Glu Ile Thr Asp Gly Asn Val Lys Glu Leu Thr Tyr Gln Pro Asn Gly
50 55 60

Ser Val Ile Glu Val Ser Gly Val Tyr Lys Asn Pro Lys Thr Ser Lys
65 70 75 80

Glu Glu Thr Gly Ile Gln Phe Phe Thr Pro Ser Val Thr Lys Val Glu
85 90 95

Lys Phe Thr Ser Thr Ile Leu Pro Ala Asp Thr Thr Val Ser Glu Leu
100 105 110

Gln Lys Leu Ala Thr Asp His Lys Ala Glu Val Thr Val Lys His Glu
115 120 125

Ser Ser Ser Gly Ile Trp Ile Asn Leu Leu Val Ser Ile Val Pro Phe
130 135 140

Gly Ile Leu Phe Phe Phe Leu Phe Ser Met Met Gly Asn Met Gly Gly
145 150 155 160

Gly Asn Gly Arg Asn Pro Met Ser Phe Gly Arg Ser Lys Ala Lys Ala
165 170 175

Ala Asn Lys Glu Asp Ile Lys Val Arg Phe Ser Asp Val Ala Gly Ala
180 185 190

Glu Glu Glu Lys Gln Glu Leu Val Glu Val Val Glu Phe Leu Lys Asp
195 200 205

Pro Lys Arg Phe Thr Lys Leu Gly Ala Arg Ile Pro Ala Gly Val Leu
210 215 220

0090700 20269260

Leu Glu Gly Pro Pro Gly Thr Gly Lys Thr Leu Leu Ala Lys Ala Val
225 230 235 240

Ala Gly Glu Ala Gly Val Pro Phe Phe Ser Ile Ser Gly Ser Asp Phe
245 250 255

Val Glu Met Phe Val Gly Val Gly Ala Ser Arg Val Arg Ser Leu Phe
260 265 270

Glu Asp Ala Lys Lys Ala Ala Pro Ala Ile Ile Phe Ile Asp Glu Ile
275 280 285

Asp Ala Val Gly Arg Gln Arg Gly Val Gly Leu Gly Gly Gly Asn Asp
290 295 300

Glu Arg Glu Gln Thr Leu Asn Gln Leu Leu Ile Glu Met Asp Gly Phe
305 310 315 320

Glu Gly Asn Glu Gly Ile Ile Val Ile Ala Ala Thr Asn Arg Ser Asp
325 330 335

Val Leu Asp Pro Ala Leu Leu Arg Pro Gly Arg Phe Asp Arg Lys Val
340 345 350

Leu Val Gly Arg Pro Asp Val Lys Gly Arg Glu Ala Ile Leu Lys Val
355 360 365

His Ala Lys Asn Lys Pro Leu Ala Glu Asp Val Asp Leu Lys Leu Val
370 375 380

Ala Gln Gln Thr Pro Gly Phe Val Gly Ala Asp Leu Glu Asn Val Leu
385 390 395 400

Asn Glu Ala Ala Leu Val Ala Ala Arg Arg Asn Lys Ser Ile Ile Asp
405 410 415

Ala Ser Asp Ile Asp Glu Ala Glu Asp Arg Val Ile Ala Gly Pro Ser
420 425 430

00969787-013604
109310-28269680

Lys Lys Asp Lys Thr Val Ser Gln Lys Glu Arg Glu Leu Val Ala Tyr
 435 440 445

His Glu Ala Gly His Thr Ile Val Gly Leu Val Leu Ser Asn Ala Arg
 450 455 460

Val Val His Lys Val Thr Ile Val Pro Arg Gly Arg Ala Gly Gly Tyr
 465 470 475 480

Met Ile Ala Leu Pro Lys Glu Asp Gln Met Leu Leu Ser Lys Glu Asp
 485 490 495

Met Lys Glu Gln Leu Ala Gly Leu Met Gly Gly Arg Val Ala Glu Glu
 500 505 510

Ile Ile Phe Asn Val Gln Thr Thr Gly Ala Ser Asn Asp Phe Glu Gln
 515 520 525

Ala Thr Gln Met Ala Arg Ala Met Val Thr Glu Tyr Gly Met Ser Glu
 530 535 540

Lys Leu Gly Pro Val Gln Tyr Glu Gly Asn His Ala Met Leu Gly Ala
 545 550 555 560

Gln Ser Pro Gln Lys Ser Ile Ser Glu Gln Thr Ala Tyr Glu Ile Asp
 565 570 575

Glu Glu Val Arg Ser Leu Leu Asn Glu Ala Arg Asn Lys Ala Ala Glu
 580 585 590

Ile Ile Gln Ser Asn Arg Glu Thr His Lys Leu Ile Ala Glu Ala Leu
 595 600 605

Leu Lys Tyr Glu Thr Leu Asp Ser Thr Gln Ile Lys Ala Leu Tyr Glu
 610 615 620

Thr Gly Lys Met Pro Glu Ala Val Glu Glu Glu Ser His Ala Leu Ser
 625 630 635 640

00150707 01501

70

Tyr Asp Glu Val Lys Ser Lys Met Asn Asp Glu Lys
645 650

<210> 27

<211> 563

<212> PRT

<213> Streptococcus pneumoniae

<400> 27

Met Lys Arg Ser Ser Leu Leu Val Arg Met Val Ile Ser Ile Phe Leu
1 5 10 15

Val Phe Leu Ile Leu Leu Ala Leu Val Gly Thr Phe Tyr Tyr Gln Ser
20 25 30

Ser Ser Ser Ala Ile Glu Ala Thr Ile Glu Gly Asn Ser Gln Thr Thr
35 40 45

Ile Ser Gln Thr Ser His Phe Ile Gln Ser Tyr Ile Lys Lys Leu Glu
50 55 60

Thr Thr Ser Thr Gly Leu Thr Gln Gln Thr Asp Val Leu Ala Tyr Ala
65 70 75 80

Glu Asn Pro Ser Gln Asp Lys Val Glu Gly Ile Arg Asp Leu Phe Leu
85 90 95

Thr Ile Leu Lys Ser Asp Lys Asp Leu Lys Thr Val Val Leu Val Thr
100 105 110

Lys Ser Gly Gln Val Ile Ser Thr Asp Asp Ser Val Gln Met Lys Thr
115 120 125

Ser Ser Asp Met Met Ala Glu Asp Trp Tyr Gln Lys Ala Ile His Gln
130 135 140

00160787.012501

Gly Ala Met Pro Val Leu Thr Pro Ala Arg Lys Ser Asp Ser Gln Trp
 145 150 155 160

Val Ile Ser Val Thr Gln Glu Leu Val Asp Ala Lys Gly Ala Asn Leu
 165 170 175

Gly Val Leu Arg Leu Asp Ile Ser Tyr Glu Thr Leu Glu Ala Tyr Leu
 180 185 190

Asn Gln Leu Gln Leu Gly Gln Gln Gly Phe Ala Phe Ile Ile Asn Glu
 195 200 205

Asn His Glu Phe Val Tyr His Pro Gln His Thr Val Tyr Ser Ser Ser
 210 215 220

Ser Lys Met Glu Ala Met Lys Pro Tyr Ile Asp Thr Gly Gln Gly Tyr
 225 230 235 240

Thr Pro Gly His Lys Ser Tyr Val Ser Gln Glu Lys Ile Ala Gly Thr
 245 250 255

Asp Trp Thr Val Leu Gly Val Ser Ser Leu Glu Lys Leu Asp Gln Val
 260 265 270

Arg Ser Gln Leu Leu Trp Thr Leu Leu Gly Ala Ser Val Thr Ser Leu
 275 280 285

Leu Val Cys Leu Cys Leu Val Trp Phe Ser Leu Lys Arg Trp Ile Ala
 290 295 300

Pro Leu Lys Asp Leu Arg Glu Thr Met Leu Glu Ile Ala Ser Gly Ala
 305 310 315 320

Gln Asn Leu Arg Ala Lys Glu Val Gly Ala Tyr Glu Leu Arg Glu Val
 325 330 335

Thr Arg Gln Phe Asn Ala Met Leu Asp Gln Ile Asp Gln Leu Met Val
 340 345 350

00759787 045604

Ser Arg Pro Gln Lys Gly Thr Lys Val Glu Ile Tyr Ile Asn Arg Ile
545 550 555 560

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<210> 28
<211> 563
<212> PRT
<213> Streptococcus pneumoniae
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Met Lys Arg Ser Ser Leu Leu Val Arg Met Val Ile Ser Ile Phe Leu
1 5 10 15

Val Phe Leu Ile Leu Leu Ala Leu Val Gly Thr Phe Tyr Tyr Gln Ser
20 25 30

Ser Ser Ser Ala Ile Glu Ala Thr Ile Glu Gly Asn Ser Gln Thr Thr
35 40 45

Ile Ser Gln Thr Ser His Phe Ile Gln Ser Tyr Ile Lys Lys Leu Glu
50 55 60

Thr Thr Ser Thr Gly Leu Thr Gln Gln Thr Asp Val Leu Ala Tyr Ala
65 70 75 80

Glu Asn Pro Ser Gln Asp Lys Val Glu Gly Ile Arg Asp Leu Phe Leu
85 90 95

Thr Ile Leu Lys Ser Asp Lys Asp Leu Lys Thr Val Val Leu Val Thr
100 105 110

Lys Ser Gly Gln Val Ile Ser Thr Asp Asp Ser Val Gln Met Lys Thr
115 120 125

Ser Ser Asp M t Met Ala Glu Asp Trp Tyr Gln Lys Ala Ile His Gln
130 135 140

Gly Ala Met Pro Val Leu Thr Pro Ala Arg Lys Ser Asp Ser Gln Trp
 145 150 155 160

Val Ile Ser Val Thr Gln Glu Leu Val Asp Ala Lys Gly Ala Asn Leu
 165 170 175

Gly Val Leu Arg Leu Asp Ile Ser Tyr Glu Thr Leu Glu Ala Tyr Leu
 180 185 190

Asn Gln Leu Gln Leu Gly Gln Gln Gly Phe Ala Phe Ile Ile Asn Glu
 195 200 205

Asn His Glu Phe Val Tyr His Pro Gln His Thr Val Tyr Ser Ser Ser
 210 215 220

Ser Lys Met Glu Ala Met Lys Pro Tyr Ile Asp Thr Gly Gln Gly Tyr
 225 230 235 240

Thr Pro Gly His Lys Ser Tyr Val Ser Gln Glu Lys Ile Ala Gly Thr
 245 250 255

Asp Trp Thr Val Leu Gly Val Ser Ser Leu Glu Lys Leu Asp Gln Val
 260 265 270

Arg Ser Gln Leu Leu Trp Thr Leu Leu Gly Ala Ser Val Thr Ser Leu
 275 280 285

Leu Val Cys Leu Cys Leu Val Trp Phe Ser Leu Lys Arg Trp Ile Ala
 290 295 300

Pro Leu Lys Asp Leu Arg Glu Thr Met Leu Glu Ile Ala Ser Gly Ala
 305 310 315 320

Gln Asn Leu Arg Ala Lys Glu Val Gly Ala Tyr Glu Leu Arg Glu Val
 325 330 335

Thr Arg Gln Phe Asn Ala Met Leu Asp Gln Il Asp Gln Leu Met Val
 340 345 350

00250767-042504

Ala Ile Arg Ser Gln Glu Glu Thr Thr Arg Gln Tyr Gln Leu Gln Ala
 355 360 365

Leu Ser Ser Gln Ile Asn Pro His Phe Leu Tyr Asn Thr Leu Asp Thr
 370 375 380

Ile Ile Trp Met Ala Glu Phe His Asp Ser Gln Arg Val Val Gln Val
 385 390 395 400

Thr Lys Ser Leu Ala Thr Tyr Phe Arg Leu Ala Leu Asn Gln Gly Lys
 405 410 415

Asp Leu Ile Cys Leu Ser Asp Glu Ile Asn His Val Arg Gln Tyr Leu
 420 425 430

Phe Ile Gln Lys Gln Arg Tyr Gly Asp Lys Leu Glu Tyr Glu Ile Asn
 435 440 445

Glu Asn Val Ala Phe Asp Asn Leu Val Leu Pro Lys Leu Val Leu Gln
 450 455 460

Pro Leu Val Glu Asn Ala Leu Tyr His Gly Ile Lys Glu Lys Glu Gly
 465 470 475 480

Gln Gly His Ile Lys Leu Ser Val Gln Lys Gln Asp Ser Gly Leu Val
 485 490 495

Ile Arg Ile Glu Asp Asp Gly Val Gly Phe Gln Asp Ala Gly Asp Ser
 500 505 510

Ser Gln Ser Gln Leu Lys Arg Gly Gly Val Gly Leu Gln Asn Val Asp
 515 520 525

Gln Arg Leu Lys Leu His Phe Gly Ala Asn Tyr His Met Lys Ile Asp
 530 535 540

Ser Arg Pro Gln Lys Gly Thr Lys Val Glu Ile Tyr Ile Asn Arg Ile
 545 550 555 560

00760707 042604

Glu Thr Ser

<210> 29

<211> 379

<212> PRT

<213> Streptococcus pneumoniae

<400> 29

Met Phe Phe Lys Leu Leu Arg Glu Ala Leu Lys Val Lys Gln Val Arg
1 5 10 15

Ser Lys Ile Leu Phe Thr Ile Phe Ile Val Leu Val Phe Arg Ile Gly
20 25 30

Thr Ser Ile Thr Val Pro Gly Val Asn Ala Asn Ser Leu Asn Ala Leu
35 40 45

Ser Gly Leu Ser Phe Leu Asn Met Leu Ser Leu Val Ser Gly Asn Ala
50 55 60

Leu Lys Asn Phe Ser Ile Phe Ala Leu Gly Val Ser Pro Tyr Ile Thr
65 70 75 80

Ala Ser Ile Val Val Gln Leu Leu Gln Met Asp Ile Leu Pro Lys Phe
85 90 95

Val Glu Trp Gly Lys Gln Gly Glu Val Gly Arg Arg Lys Leu Asn Gln
100 105 110

Ala Thr Arg Tyr Ile Ala Leu Val Leu Ala Phe Val Gln Ser Ile Gly
115 120 125

Ile Thr Ala Gly Phe Asn Thr Leu Ala Gly Ala Gln Leu Ile Lys Thr
130 135 140

00360767 043604

Ala Leu Thr Pro Gln Val Phe Leu Thr Ile Gly Ile Ile Leu Thr Ala
145 150 155 160

Gly Ser Met Ile Val Thr Trp Leu Gly Glu Gln Ile Thr Asp Lys Gly
165 170 175

Tyr Gly Asn Gly Val Ser Met Ile Ile Phe Ala Gly Ile Val Ser Ser
180 185 190

Ile Pro Glu Met Ile Gln Gly Ile Tyr Val Asp Tyr Phe Val Asn Val
195 200 205

Pro Ser Ser Arg Ile Thr Ser Ser Ile Ile Phe Val Ile Ile Leu Ile
210 215 220

Ile Thr Val Leu Leu Ile Ile Tyr Phe Thr Thr Tyr Val Gln Gln Ala
225 230 235 240

Glu Tyr Lys Ile Pro Ile Gln Tyr Thr Lys Val Ala Gln Gly Ala Pro
245 250 255

Ser Ser Ser Tyr Leu Pro Leu Lys Val Asn Pro Ala Gly Val Ile Pro
260 265 270

Val Ile Phe Ala Ser Ser Ile Thr Ala Ala Pro Ala Ala Ile Leu Gln
275 280 285

Phe Leu Ser Ala Thr Gly His Asp Trp Ala Trp Val Arg Val Ala Gln
290 295 300

Glu Met Leu Ala Thr Thr Ser Pro Thr Gly Ile Ala Met Tyr Ala Leu
305 310 315 320

Leu Ile Ile Leu Phe Thr Phe Phe Tyr Thr Phe Val Gln Ile Asn Pro
325 330 335

Glu Lys Ala Ala Glu Thr Tyr Lys Arg Val Val Pro Ile Ser Met Glu
340 345 350

0060907 04304
FOSEP 2029260

Val Leu Gln Leu Leu Val Pro Ser Ser Leu Val
370 375

<213> Streptococcus pneumoniae

Met Asp Ile Arg Gln Val Thr Glu Thr Ile Ala Met Ile Glu Glu Gln
1 5 10 15

Asn Phe Asp Ile Arg Thr Ile Thr Met Gly Ile Ser Leu Leu Asp Cys
20 25 30

Ile Asp Pro Asp Ile Asn Arg Ala Ala Glu Lys Ile Tyr Gln Lys Ile
35 40 45

Thr Thr Lys Ala Ala Asn Leu Val Ala Val Gly Asp Glu Ile Ala Ala
50 55 60

Glu Leu Gly Ile Pro Ile Val Asn Lys Arg Val Ser Val Thr Pro Ile
65 70 75 80

Ser Leu Ile Gly Ala Ala Thr Asp Ala Thr Asp Tyr Val Val Leu Ala
85 90 95

Lys Ala Leu Asp Lys Ala Ala Lys Glu Ile Gly Val Asp Phe Ile Gly
100 105 110

Gly Phe Ser Ala Leu Val Gln Lys Gly Tyr Gln Lys Gly Asp Glu Ile
115 120 125

Gly Gly Leu Ser Gly Ala Phe Ile Pro Val Ser Glu Asp Glu Gly Met
325 330 335

Ile Ala Ala Val Gln Asn Gly Ser Leu Asn Leu Glu Lys Leu Glu Ala
 340 345 350

Met Thr Ala Ile Cys Ser Val Gly Leu Asp Met Ile Ala Ile Pro Glu
 355 360 365

Asp Thr Pro Ala Glu Thr Ile Ala Ala Met Ile Ala Asp Glu Ala Ala
 370 375 380

Ile Gly Val Ile Asn Met Lys Thr Thr Ala Val Arg Ile Ile Pro Lys
 385 390 395 400

Gly Lys Glu Gly Asp Met Ile Glu Phe Gly Gly Leu Leu Gly Thr Ala
 405 410 415

Pro Val Met Lys Val Asn Gly Ala Ser Ser Val Asp Phe Ile Ser Arg
 420 425 430

Gly Gly Gln Ile Pro Ala Pro Ile His Ser Phe Lys Asn
 435 440 445

<210> 31

<211> 285

<212> PRT

<213> Streptococcus pneumoniae

<400> 31

Met Thr Gln Ile Ile Asp Gly Lys Ala Leu Ala Ala Lys Leu Gln Gly
 1 5 10 15

Gln Leu Ala Glu Lys Thr Ala Lys Leu Lys Glu Glu Thr Gly Leu Val
 20 25 30

Pro Gly Leu Val Val Ile Leu Val Gly Asp Asn Pro Ala Ser Gln Val
 35 40 45

00050707 010504

Tyr Val Arg Asn Lys Glu Arg Ser Ala Leu Ala Ala Gly Phe Arg Ser
50 55 60

Glu Val Val Arg Val Pro Glu Thr Ile Thr Gln Glu Glu Leu Leu Asp
65 70 75 80

Leu Ile Ala Lys Tyr Asn Gln Asp Pro Ala Trp His Gly Ile Leu Val
85 90 95

Gln Leu Pro Leu Pro Lys His Ile Asp Glu Glu Ala Val Leu Leu Ala
100 105 110

Ile Asp Pro Glu Lys Asp Val Asp Gly Phe His Pro Leu Asn Met Gly
115 120 125

Arg Leu Trp Ser Gly His Pro Val Met Ile Pro Ser Thr Pro Ala Gly
130 135 140

Ile Met Glu Met Phe His Glu Tyr Gly Ile Asp Leu Glu Gly Lys Asn
145 150 155 160

Ala Val Val Ile Gly Arg Ser Asn Ile Val Gly Lys Pro Met Ala Gln
165 170 175

Leu Leu Leu Ala Lys Asn Ala Thr Val Thr Leu Thr His Ser Arg Thr
180 185 190

His Asn Leu Ser Lys Val Ala Ala Lys Ala Asp Ile Leu Val Val Ala
195 200 205

Ile Gly Arg Ala Lys Phe Val Thr Ala Asp Phe Val Lys Pro Gly Ala
210 215 220

Val Val Ile Asp Val Gly Met Asn Arg Asp Glu Asn Gly Lys Leu Cys
225 230 235 240

Gly Asp Val Asp Tyr Glu Ala Val Ala Pro Leu Ala Ser His Ile Thr
245 250 255

006070 101601
109270 102691

Pro Val Pro Gly Gly Val Gly Pro Met Thr Ile Thr Met Leu Met Glu
 260 265 270

Gln Thr Tyr Gln Ala Ala Leu Arg Thr Leu Asp Arg Lys
 275 280 285

<210> 32

<211> 403

<212> PRT

<213> Streptococcus pneumoniae

<400> 32

Met Ser Lys Phe Asn Arg Ile His Leu Val Val Leu Asp Ser Val Gly
 1 5 10 15

Ile Gly Ala Ala Pro Asp Ala Asn Asn Phe Val Asn Ala Gly Val Pro
 20 25 30

Asp Gly Ala Ser Asp Thr Leu Gly His Ile Ser Lys Thr Val Gly Leu
 35 40 45

Asn Val Pro Asn Met Ala Lys Ile Gly Leu Gly Asn Ile Pro Arg Glu
 50 55 60

Thr Pro Leu Lys Thr Val Ala Ala Glu Ser Asn Pro Thr Gly Tyr Ala
 65 70 75 80

Thr Lys Leu Glu Glu Val Ser Leu Gly Lys Asp Thr Met Thr Gly His
 85 90 95

Trp Glu Ile Met Gly Leu Asn Ile Thr Glu Pro Phe Asp Thr Phe Trp
 100 105 110

Asn Gly Phe Pro Glu Glu Ile Leu Thr Lys Ile Glu Glu Phe Ser Gly
 115 120 125

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Arg Lys Val Ile Arg Glu Ala Asn Lys Pro Tyr Ser Gly Thr Ala Val
130 135 140

Ile Tyr Asp Phe Gly Pro Arg Gln Met Glu Thr Gly Glu Leu Ile Ile
145 150 155 160

Tyr Thr Ser Ala Asp Pro Val Leu Gln Ile Ala Ala His Glu Asp Ile
165 170 175

Ile Pro Leu Asp Glu Leu Tyr Arg Ile Cys Glu Tyr Ala Arg Ser Ile
180 185 190

Thr Leu Glu Arg Pro Ala Leu Leu Gly Arg Ile Ile Ala Arg Pro Tyr
195 200 205

Val Gly Glu Pro Gly Asn Phe Thr Arg Thr Ala Asn Arg Arg Asp Leu
210 215 220

Ala Val Ser Pro Phe Phe Pro Thr Val Leu Asp Lys Leu Asn Glu Ala
225 230 235 240

Gly Ile Asp Thr Tyr Ala Val Gly Lys Ile Asn Asp Ile Phe Asn Gly
245 250 255

Ala Gly Ile Asn His Asp Met Gly His Asn Lys Ser Asn Ser His Gly
260 265 270

Ile Asp Thr Leu Leu Lys Thr Met Gly Leu Ala Glu Phe Glu Lys Gly
275 280 285

Phe Ser Phe Thr Asn Leu Val Asp Phe Asp Ala Leu Tyr Gly His Arg
290 295 300

Arg Asn Ala His Gly Tyr Arg Asp Cys Leu His Glu Phe Asp Glu Arg
305 310 315 320

Leu Pro Glu Ile Ile Ala Ala Met Arg Glu Asn Asp Leu Leu Leu Ile
325 330 335

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Thr Ala Asp His Gly Asn Asp Pro Thr Tyr Ala Gly Thr Asp His Thr
 340 345 350

Arg Glu Tyr Ile Pro Leu Leu Ala Tyr Ser Pro Ala Phe Lys Gly Asn
 355 360 365

Gly Leu Ile Pro Val Gly His Phe Ala Asp Ile Ser Ala Thr Val Ala
 370 375 380

Asp Asn Phe Gly Val Glu Thr Ala Met Ile Gly Glu Ser Phe Leu Asp
 385 390 395 400

Lys Leu Val

<210> 33

<211> 326

<212> PRT

<213> Streptococcus pneumoniae

<400> 33

Met Phe Ile Ser Ile Ser Ala Gly Ile Val Thr Phe Leu Leu Thr Leu
 1 5 10 15

Val Glu Ile Pro Ala Phe Ile Gln Phe Tyr Arg Lys Ala Gln Ile Thr
 20 25 30

Gly Gln Gln Met His Glu Asp Val Lys Gln His Gln Ala Lys Ala Gly
 35 40 45

Thr Pro Thr Met Gly Gly Leu Val Phe Leu Ile Thr Ser Val Leu Val
 50 55 60

Ala Phe Phe Phe Ala Leu Phe Ser Ser Gln Phe Ser Asn Asn Val Gly
 65 70 75 80

00360387 043601
 1032510 4820360

85

Met Ile Leu Phe Ile Leu Val Leu Tyr Gly Leu Val Gly Phe Leu Asp
85 90 95

Asp Phe Leu Lys Val Phe Arg Lys Ile Asn Glu Gly Leu Asn Pro Lys
100 105 110

Gln Lys Leu Ala Leu Gln Leu Leu Gly Gly Val Ile Phe Tyr Leu Phe
115 120 125

Tyr Glu Arg Gly Gly Asp Ile Leu Ser Val Phe Gly Tyr Pro Val His
130 135 140

Leu Gly Phe Phe Tyr Ile Phe Phe Ala Leu Phe Trp Leu Val Gly Phe
145 150 155 160

Ser Asn Ala Val Asn Leu Thr Asp Gly Val Asp Gly Leu Ala Ser Ile
165 170 175

Ser Val Val Ile Ser Leu Ser Ala Tyr Gly Val Ile Ala Tyr Val Gln
180 185 190

Gly Gln Met Asp Ile Leu Leu Val Ile Leu Ala Met Ile Gly Gly Leu
195 200 205

Leu Gly Phe Phe Ile Phe Asn His Lys Pro Ala Lys Val Phe Met Gly
210 215 220

Asp Val Gly Ser Leu Ala Leu Gly Gly Met Leu Ala Ala Ile Ser Met
225 230 235 240

Ala Leu His Gln Glu Trp Thr Leu Leu Ile Ile Gly Ile Val Tyr Val
245 250 255

Phe Glu Thr Thr Ser Val Met Met Gln Val Ser Tyr Phe Lys Leu Thr
260 265 270

Gly Gly Lys Arg Ile Phe Arg Met Thr Pro Val His His His Phe Glu
275 280 285

0096074 20269260

Leu Gly Gly Leu Ser Gly Lys Gly Asn Pro Trp Ser Glu Trp Lys Val
 290 295 300

Asp Phe Phe Phe Trp Gly Val Gly Leu Leu Ala Ser Leu Leu Thr Leu
 305 310 315 320

Ala Ile Leu Tyr Leu Met
 325

<210> 34

<211> 426

<212> PRT

<213> Streptococcus pneumoniae

<400> 34

Leu Phe Lys Lys Asn Lys Asp Ile Leu Asn Ile Ala Leu Pro Ala Met
 1 5 10 15

Gly Glu Asn Phe Leu Gln Met Leu Met Gly Met Val Asp Ser Tyr Leu
 20 25 30

Val Ala His Leu Gly Leu Ile Ala Ile Ser Gly Val Ser Val Ala Gly
 35 40 45

Asn Ile Ile Thr Ile Tyr Gln Ala Ile Phe Ile Ala Leu Gly Ala Ala
 50 55 60

Ile Ser Ser Val Ile Ser Lys Ser Ile Gly Gln Lys Asp Gln Ser Lys
 65 70 75 80

Leu Ala Tyr His Val Thr Glu Ala Leu Lys Ile Thr Leu Leu Leu Ser
 85 90 95

Phe Leu Leu Gly Phe Leu Ser Ile Phe Ala Gly Lys Glu Met Ile Gly
 100 105 110

00360707 013601

Leu Phe Leu Met Leu Pro Leu Ser Phe Ser Ile Tyr Val Leu Gly Val
305 310 315 320

Ala Thr Ala Leu Gly Tyr Ser Ala Glu Gln Leu Thr Tyr Leu Il Ser
35 40 45

Thr Asp Ile Phe Met Cys Gly Val Ala Thr Phe Leu Gln Leu Gln Leu
50 55 60

Asn Lys Tyr Phe Gly Ile Gly Leu Pro Val Val Leu Gly Val Ala Phe
65 70 75 80

Gln Ser Val Ala Pro Leu Ile Met Ile Gly Gln Ser His Gly Ser Gly
85 90 95

Ala Met Phe Gly Ala Leu Ile Ala Ser Gly Ile Tyr Val Val Leu Val
100 105 110

Ser Gly Ile Phe Ser Lys Val Ala Asn Leu Phe Pro Ser Ile Val Thr
115 120 125

Gly Ser Val Ile Thr Thr Ile Gly Leu Thr Leu Ile Pro Val Ala Ile
130 135 140

Gly Asn Met Gly Asn Asn Val Pro Glu Pro Thr Gly Gln Ser Leu Leu
145 150 155 160

Leu Ala Ala Ile Thr Val Leu Ile Ile Leu Leu Ile Asn Ile Phe Thr
165 170 175

Lys Gly Phe Ile Lys Ser Ile Ser Ile Leu Ile Gly Leu Val Val Gly
180 185 190

Thr Ala Ile Ala Ala Thr Met Gly Leu Val Asp Phe Ser Pro Val Ala
195 200 205

Val Ala Pro Leu Val His Val Pro Thr Pro Leu Tyr Phe Gly Met Pro
210 215 220

Thr Phe Glu Ile Ser Ser Ile Val Met Met Cys Ile Ile Ala Thr Val
225 230 235 240

Ser Met Val Glu Ser Thr Gly Val Tyr Leu Ala Leu Ser Asp Ile Thr
245 250 255

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Lys Asp Pro Ile Asp Ser Thr Arg Leu Arg Asn Gly Tyr Arg Ala Glu
 260 265 270

Gly Leu Ala Val Leu Leu Gly Gly Ile Phe Asn Thr Phe Pro Tyr Thr
 275 280 285

Gly Phe Ser Gln Asn Val Gly Leu Val Lys Leu Ser Gly Ile Lys Lys
 290 295 300

Arg Leu Pro Ile Tyr Tyr Ala Ala Gly Phe Leu Val Leu Leu Gly Leu
 305 310 315 320

Leu Pro Lys Phe Gly Ala Leu Ala Gln Ile Ile Pro Ser Ser Val Leu
 325 330 335

Gly Gly Ala Met Leu Val Met Phe Gly Phe Val Ser Ile Gln Gly Met
 340 345 350

Gln Ile Leu Ala Arg Val Asp Phe Ala Asn Asn Glu His Asn Phe Leu
 355 360 365

Ile Ala Ala Val Ser Ile Ala Ala Gly Val Gly Leu Asn Asn Ser Asn
 370 375 380

Leu Phe Val Ser Met Pro Thr Ala Phe Gln Met Phe Phe Ser Asn Gly
 385 390 395 400

Ile Val Val Ala Ser Leu Leu Ala Ile Val Leu Asn Ala Val Leu Asn
 405 410 415

His Lys Lys Lys
 420

009997-01360
 1099210-2829260

<210> 36

<211> 784

<212> PRT

<213> Streptococcus pneumoniae

<400> 36

Met Lys Asp Arg Ile Lys Glu Tyr Leu Gln Asp Lys Gly Lys Val Thr
 1 5 10 15

Val Asn Asp Leu Ala Gln Ala Leu Gly Lys Asp Ser Ser Lys Asp Phe
 20 25 30

Arg Glu Leu Ile Lys Thr Leu Ser Leu Met Glu Arg Lys His Gln Ile
 35 40 45

Arg Phe Glu Glu Asp Gly Ser Leu Thr Leu Glu Ile Lys Lys Lys His
 50 55 60

Glu Ile Thr Leu Lys Gly Ile Phe His Ala His Lys Asn Gly Phe Gly
 65 70 75 80

Phe Val Ser Leu Glu Gly Glu Glu Asp Asp Leu Phe Val Gly Lys Asn
 85 90 95

Asp Val Asn Tyr Ala Ile Asp Gly Asp Thr Val Glu Val Val Ile Lys
 100 105 110

Lys Val Ala Asp Arg Asn Lys Gly Thr Ala Ala Glu Ala Lys Ile Ile
 115 120 125

Asp Ile Leu Glu His Ser Leu Thr Thr Val Val Gly Gln Ile Val Leu
 130 135 140

Asp Gln Glu Lys Pro Lys Tyr Ala Gly Tyr Ile Arg Ser Lys Asn Gln
 145 150 155 160

Lys Ile Ser Gln Pro Ile Tyr Val Lys Lys Pro Ala Leu Lys Leu Glu
 165 170 175

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 009607010560

Gly Thr Glu Val Leu Lys Val Phe Ile Asp Lys Tyr Pro Ser Lys Lys
 180 185 190

His Asp Phe Phe Val Ala Ser Val Leu Asp Val Val Gly His Ser Thr
 195 200 205

Asp Val Gly Ile Asp Val Leu Glu Val Leu Glu Ser Met Asp Ile Val
 210 215 220

Ser Glu Phe Pro Glu Ala Val Val Lys Glu Ala Glu Ser Val Pro Asp
 225 230 235 240

Ala Pro Ser Gln Lys Asp Met Glu Gly Arg Leu Asp Leu Arg Asp Glu
 245 250 255

Ile Thr Phe Thr Ile Asp Gly Ala Asp Ala Lys Asp Leu Asp Asp Ala
 260 265 270

Val His Ile Lys Ala Leu Lys Asn Gly Asn Leu Glu Phe Gly Val His
 275 280 285

Ile Ala Asp Val Ser Tyr Tyr Val Thr Glu Gly Ser Ala Leu Asp Lys
 290 295 300

Glu Ala Leu Asn Arg Ala Thr Ser Val Tyr Val Thr Asp Arg Val Val
 305 310 315 320

Pro Met Leu Pro Glu Arg Leu Ser Asn Gly Ile Cys Ser Leu Asn Pro
 325 330 335

Gln Val Asp Arg Leu Thr Gln Ser Ala Ile Met Glu Ile Asp Lys His
 340 345 350

Gly Arg Val Val Asn Tyr Thr Ile Thr Gln Thr Val Ile Lys Thr Ser
 355 360 365

Phe Arg Met Thr Tyr Ser Asp Val Asn Asp Ile Leu Ala Gly Asp Glu
 370 375 380

00769707 013604

Glu Lys Arg Lys Glu Tyr His Lys Ile Val Ser Ser Ile Glu Leu Met
385 390 395 400

Ala Lys Leu His Glu Thr Leu Glu Asn Met Arg Val Lys Arg Gly Ala
405 410 415

Leu Asn Phe Asp Thr Asn Glu Ala Lys Ile Leu Val Asp Lys Gln Gly
420 425 430

Lys Pro Val Asp Ile Val Leu Arg Gln Arg Gly Ile Ala Glu Arg Met
435 440 445

Ile Glu Ser Phe Met Leu Met Ala Asn Glu Thr Val Ala Glu His Phe
450 455 460

Ser Lys Leu Asp Leu Pro Phe Ile Tyr Arg Ile His Glu Glu Pro Lys
465 470 475 480

Ala Glu Lys Val Gln Lys Phe Ile Asp Tyr Ala Ser Ser Phe Gly Leu
485 490 495

Arg Ile Tyr Gly Thr Ala Ser Glu Ile Ser Gln Glu Ala Leu Gln Asp
500 505 510

Ile Met Arg Ala Val Glu Gly Glu Pro Tyr Ala Asp Val Leu Ser Met
515 520 525

Met Leu Leu Arg Ser Met Gln Gln Ala Arg Tyr Ser Glu His Asn His
530 535 540

Gly His Tyr Gly Leu Ala Ala Asp Tyr Tyr Thr His Phe Thr Ser Pro
545 550 555 560

Ile Arg Arg Tyr Pro Asp Leu Leu Val His Arg Met Ile Arg Asp Tyr
565 570 575

Gly Arg Ser Lys Glu Ile Ala Glu His Phe Glu Gln Val Ile Pro Glu
580 585 590

00760709 043604
T09270 40209200

Ile Ala Thr Gln Ser Ser Asn Arg Glu Arg Arg Ala Ile Glu Ala Glu
595 600 605

Arg Glu Val Glu Ala Met Lys Lys Ala Glu Tyr Met Glu Glu Tyr Val
610 615 620

Gly Glu Glu Tyr Asp Ala Val Val Ser Ser Ile Val Lys Phe Gly Leu
625 630 635 640

Phe Val Glu Leu Pro Asn Thr Val Glu Gly Leu Ile His Ile Thr Asn
645 650 655

Leu Pro Glu Phe Tyr His Phe Asn Glu Arg Asp Leu Thr Leu Arg Gly
660 665 670

Glu Lys Ser Gly Ile Thr Phe Arg Val Gly Gln Gln Ile Arg Ile Arg
675 680 685

Val Glu Arg Ala Asp Lys Met Thr Gly Glu Ile Asp Phe Ser Phe Val
690 695 700

Pro Ser Glu Phe Asp Val Ile Glu Lys Gly Leu Lys Gln Ser Ser Arg
705 710 715 720

Ser Gly Arg Gly Arg Asp Ser Asn Arg Arg Ser Asp Lys Lys Glu Asp
725 730 735

Lys Arg Lys Ser Gly Arg Ser Asn Asp Lys Arg Lys His Ser Gln Lys
740 745 750

Asp Lys Lys Lys Lys Gly Lys Lys Pro Phe Tyr Lys Glu Val Ala Lys
755 760 765

Lys Gly Ala Lys His Gly Lys Gly Arg Gly Lys Gly Arg Arg Thr Lys
770 775 780

00160704 042604

Ser Ala Gly L u S r Val Leu Thr Gly Ile Asp Ile Asn Ile Leu Ile
145 150 155 160

Ser Val Ala Thr Ser Trp Thr Leu Asp Ile Gln Asp Val Ile Ser Lys
355 360 365

Ser Leu Ser Leu Cys Ala Tyr Ala Leu Asn Gln His Arg Ser Gln Glu
20 25 30

Asn Lys Asp Asn Asn Arg Val Ser Tyr Val Asp Gly Ser Gln Ser Ser
35 40 45

Gln Lys Ser Glu Asn Leu Thr Pro Asp Gln Val Ser Gln Lys Glu Gly
50 55 60

Ile Gln Ala Glu Gln Ile Val Ile Lys Ile Thr Asp Gln Gly Tyr Val
65 70 75 80

Thr Ser His Gly Asp His Tyr His Tyr Tyr Asn Gly Lys Val Pro Tyr
85 90 95

Asp Ala Leu Phe Ser Glu Glu Leu Leu Met Lys Asp Pro Asn Tyr Gln
100 105 110

Leu Lys Asp Ala Asp Ile Val Asn Glu Val Lys Gly Gly Tyr Ile Ile
115 120 125

Lys Val Asp Gly Lys Tyr Tyr Val Tyr Leu Lys Asp Ala Ala His Ala
130 135 140

Asp Asn Val Arg Thr Lys Asp Glu Ile Asn Arg Gln Lys Gln Glu His
145 150 155 160

Val Lys Asp Asn Glu Lys Val Asn Ser Asn Val Ala Val Ala Arg Ser
165 170 175

Gln Gly Arg Tyr Thr Thr Asn Asp Gly Tyr Val Phe Asn Pro Ala Asp
180 185 190

Ile Ile Glu Asp Thr Gly Asn Ala Tyr Ile Val Pro His Gly Gly His
195 200 205

Tyr His Tyr Ile Pro Lys Ser Asp Leu Ser Ala Ser Glu Leu Ala Ala
210 215 220

09760707 043604

Asn Ser Leu Ala Thr Pro Ser Pro Ser Leu Pro Ile Asn Pro Gly Thr
420 425 430

Ser His Glu Lys His Glu Glu Asp Gly Tyr Gly Phe Asp Ala Asn Arg
 435 440 445

Ile Ile Ala Glu Asp Glu Ser Gly Phe Val Met Ser His Gly Asp His
 450 455 460

Asn His Tyr Phe Phe Lys Lys Asp Leu Thr Glu Glu Gln Ile Lys Val
 465 470 475 480

Arg Lys Asn Ile

<210> 39

<211> 153

<212> PRT

<213> Streptococcus pneumoniae

<400> 39

Met Lys Lys Arg Ala Ile Val Ala Val Ile Val Leu Leu Leu Ile Gly
 1 5 10 15

Leu Asp Gln Leu Val Lys Ser Tyr Ile Val Gln Gln Ile Pro Leu Gly
 20 25 30

Glu Val Arg Ser Trp Ile Pro Asn Phe Val Ser Leu Thr Tyr Leu Gln
 35 40 45

Asn Arg Gly Ala Ala Phe Ser Ile Leu Gln Asp Gln Gln Leu Leu Phe
 50 55 60

Ala Val Ile Thr Leu Val Val Val Ile Gly Ala Ile Trp Tyr Leu His
 65 70 75 80

Lys His Met Glu Asp Ser Phe Trp Met Val Leu Gly Leu Thr Leu Ile
 85 90 95

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Lys Asp Leu Gly Val Phe Val Asp Thr Gly Leu Pro Asp Lys Glu Ile
85 90 95

<213> streptococcus pneumoniae

Met Lys Asp Val Ser Leu Phe Leu Leu Lys Lys Val Phe Lys Ser Arg
1 5 10 15

Leu Asn Trp Ile Val Leu Ala Leu Phe Val Ser Val Leu Gly Val Thr
20 25 30

Phe Tyr Leu Asn Ser Gln Thr Ala Asn Ser His Ser Leu Glu Ser Arg
35 40 45

Leu Glu Ser Arg Ile Ala Ala Asn Glu Arg Ala Ile Asn Glu Asn Glu

50 55 60

Glu Lys Leu Ser Gln Met Ser Asp Thr Ser Ser Glu Glu Tyr Gln Phe
65 70 75 80

Ala Lys Asn Asn Leu Asp Val Gln Lys Asn Leu Leu Thr Arg Lys Thr
85 90 95

Glu Ile Leu Thr Leu Leu Lys Glu Gly Arg Trp Lys Glu Ala Tyr Tyr
100 105 110

Leu Gln Trp Gln Asp Glu Glu Lys Asn Tyr Glu Phe Val Ser Asn Asp
115 120 125

Pro Thr Ala Ser Pro Gly Leu Lys Met Gly Val Asp Arg Glu Arg Lys
130 135 140

Ile Tyr Gln Ala Leu Tyr Pro Leu Asn Ile Lys Ala His Thr Leu Glu
145 150 155 160

Phe Pro Thr His Gly Ile Asp Gln Ile Val Trp Ile Leu Glu Val Ile
165 170 175

Ile Pro Ser Leu Ph Val Val Ala Ile Ile Phe Met Leu Thr Gln Leu
180 185 190

Phe Ala Glu Arg Tyr Gln Asn His Leu Asp Thr Ala His Leu Tyr Pro
195 200 205

Val Ser Lys Val Thr Phe Ala Ile Ser Ser Leu Gly Val Gly Val Gly
210 215 220

Tyr Val Thr Val Leu Phe Ile Gly Ile Cys Gly Phe Ser Phe Leu Val
225 230 235 240

Gly Ser Leu Ile Ser Gly Phe Gly Gln Leu Asp Tyr Pro Tyr Pro Ile
245 250 255

Tyr Ser Leu Val Asn Gln Glu Val Thr Ile Gly Lys Ile Gln Asp Val
260 265 270

Leu Phe Pro Gly Leu Leu Leu Ala Phe Leu Ala Phe Ile Val Ile Val
275 280 285

Glu Val Val Tyr Leu Ile Ala Tyr Phe Phe Lys Gln Lys Met Pro Val
290 295 300

Leu Phe Leu Ser Leu Ile Gly Ile Val Gly Leu Leu Phe Gly Ile Gln
305 310 315 320

Thr Ile Gln Pro Leu Gln Arg Ile Ala His Leu Ile Pro Phe Thr Tyr
325 330 335

Leu Arg Ser Val Glu Ile Leu Ser Gly Arg Leu Pro Lys Gln Ile Asp
340 345 350

Asn Val Asp Leu Asn Trp Ser Met Gly Met Val Leu Leu Pro Cys Leu
355 360 365

Ile Ile Phe Leu Leu Leu Gly Ile Leu Phe Ile Glu Arg Trp Gly Ser
370 375 380

00760707 043604

Ser Gln Lys Lys Glu Phe Phe Asn Arg Phe
385 390

<210> 42

<211> 448

<212> PRT

<213> Streptococcus pneumoniae

<400> 42

Met Met Lys Phe Ile Leu Asp Ile Val Ser Thr Pro Ala Ile Leu Val
1 5 10 15

Ala Leu Ile Ala Ile Leu Gly Leu Val Leu Gln Lys Lys Lys Leu Pro
20 25 30

Asp Ile Ile Lys Gly Gly Ile Lys Thr Phe Val Gly Phe Leu Val Val
35 40 45

Ser Gly Gly Ala Gly Ile Val Gln Asn Ser Leu Asn Pro Phe Gly Thr
50 55 60

Met Phe Glu His Ala Phe His Leu Ser Gly Val Val Pro Asn Asn Glu
65 70 75 80

Ala Ile Val Ala Val Ala Leu Thr Thr Tyr Gly Ser Ala Thr Ala Met
85 90 95

Ile Met Phe Ala Gly Met Val Phe Asn Ile Leu Ile Ala Arg Phe Thr
100 105 110

Arg Phe Lys Tyr Ile Phe Leu Thr Gly His His Thr Leu Tyr Met Ala
115 120 125

Cys Met Ile Ala Val Ile Leu Ser Val Ala Gly Phe Thr Ser Leu Pro
130 135 140

00309704304

Thr Val Val Ile Leu Pro Gly Val Val Pro His Phe Phe Cys Gly Ala
340 345 350

Thr Ala Gly Val Ile Gly Asn Ala Ser Gly Gly Val Arg Gly Ala Thr
 355 360 365

Ile Gly Ala Phe Leu Gln Gly Ile Leu Ile Ser Phe Leu Pro Val Phe
 370 375 380

Leu Met Pro Val Leu Gly Gly Leu Gly Phe Gln Gly Ser Thr Phe Ser
 385 390 395 400

Asp Ala Asp Phe Gly Leu Ser Gly Ile Ile Leu Gly Met Leu Asn Gln
 405 410 415

Phe Gly Ser Gln Ala Gly Ile Val Ile Gly Leu Val Leu Ile Leu Ala
 420 425 430

Val Met Phe Gly Val Ser Phe Ile Lys Lys Pro Ser Ala Thr Glu Glu
 435 440 445

<210> 43

<211> 333

<212> PRT

<213> Streptococcus pneumoniae

<400> 43

Met Ile Lys Thr Phe Leu Ser Ala Leu Ser Val Ile Leu Phe Ser Ile
 1 5 10 15

Pro Ile Ile Thr Tyr Ser Phe Phe Pro Ser Ser Asn Leu Asn Ile Trp
 20 25 30

Leu Ser Thr Gln Pro Ile Leu Ala Gln Ile Tyr Ala Phe Pro Leu Ala
 35 40 45

109310 282560

Thr Ala Thr Met Ala Ala Ile Leu Ser Phe Leu Phe Phe Phe Leu Ser
50 55 60

Phe Tyr Lys Lys Asn Lys Gln Ile Arg Phe Tyr Ser Gly Ile Leu Leu
65 70 75 80

Leu Leu Ser Leu Ile Leu Leu Leu Phe Gly Thr Asp Lys Thr Leu Ser
85 90 95

Ser Ala Ser Asn Lys Thr Lys Thr Leu Lys Leu Val Thr Trp Asn Val
100 105 110

Ala Asn Gln Ile Glu Ala Gln His Ile Glu Arg Ile Phe Ser His Phe
115 120 125

Asp Ala Asp Met Ala Ile Phe Pro Glu Leu Ala Thr Asn Ile Arg Gly
130 135 140

Glu Gln Glu Asn Gln Arg Ile Lys Leu Leu Phe His Gln Val Gly Leu
145 150 155 160

Ser Met Ala Asn Tyr Asp Ile Phe Thr Ser Pro Pro Thr Asn Ser Gly
165 170 175

Ile Ala Pro Val Thr Val Ile Val Lys Lys Ser Tyr Gly Phe Tyr Thr
180 185 190

Glu Ala Lys Thr Phe His Thr Thr Arg Phe Gly Thr Ile Val Leu His
195 200 205

Ser Arg Lys Gln Asn Ile Pro Asp Ile Ile Ala Leu His Thr Ala Pro
210 215 220

Pro Leu Pro Gly Leu Met Glu Ile Trp Lys Gln Asp Leu Asn Ile Ile
225 230 235 240

His Asn Gln Leu Ala Ser Lys Tyr Pro Lys Ala Ile Ile Ala Gly Asp
245 250 255

00960387 043004

Phe Asn Ala Thr Met Arg His Gly Ala Leu Ala Lys Ile Ser Ser His
 260 265 270

Arg Asp Ala Leu Asn Ala Leu Pro Pro Phe Glu Arg Gly Thr Trp Asn
 275 280 285

Ser Gln Ser Pro Lys Leu Phe Asn Ala Thr Ile Asp His Ile Leu Leu
 290 295 300

Pro Lys Asn His Tyr Tyr Val Lys Asp Leu Asp Ile Val Ser Phe Gln
 305 310 315 320

Asn Ser Asp His Arg Cys Ile Phe Thr Glu Ile Thr Phe
 325 330

<210> 44

<211> 425

<212> PRT

<213> Streptococcus pneumoniae

<400> 44

Met Asn Pro Ile Gln Arg Ser Trp Ala Tyr Val Ser Arg Lys Arg Leu
 1 5 10 15

Arg Ser Phe Ile Leu Phe Leu Ile Leu Leu Val Leu Leu Ala Gly Ile
 20 25 30

Ser Ala Cys Leu Thr Leu Met Lys Ser Asn Lys Thr Val Glu Ser Asn
 35 40 45

Leu Tyr Lys Ser Leu Asn Thr Ser Phe Ser Ile Lys Lys Ile Glu Asn
 50 55 60

Gly Gln Thr Phe Lys Leu Ser Asp Leu Ala Ser Val Ser Lys Ile Lys
 65 70 75 80

103210 232320

110

Gly Leu Glu Asn Val Ser Pro Glu Leu Glu Thr Val Ala Lys Leu Lys
85 90 95

Asp Lys Glu Ala Val Thr Gly Glu Gln Ser Val Glu Arg Asp Asp Leu
100 105 110

Ser Ala Ala Asp Asn Asn Leu Val Ser Leu Thr Ala Leu Glu Asp Ser
115 120 125

Ser Lys Asp Val Thr Phe Thr Ser Ser Ala Phe Asn Leu Lys Glu Gly
130 135 140

Arg His Leu Gln Lys Gly Asp Ser Lys Lys Ile Leu Ile His Glu Glu
145 150 155 160

Leu Ala Lys Lys Asn Gly Leu Ser Leu His Asp Lys Ile Gly Leu Asp
165 170 175

Ala Gly Gln Ser Glu Ser Gly Lys Gly Gln Thr Val Glu Phe Glu Ile
180 185 190

Ile Gly Ile Phe Ser Gly Lys Lys Gln Glu Lys Phe Thr Gly Leu Ser
195 200 205

Ser Asp Phe Ser Glu Asn Gln Val Phe Thr Asp Tyr Glu Ser Ser Gln
210 215 220

Thr Leu Leu Gly Asn Ser Glu Ala Gln Val Ser Ala Ala Arg Phe Tyr
225 230 235 240

Val Glu Asn Pro Lys Glu Met Asp Gly Leu Met Lys Gln Val Glu Asn
245 250 255

Leu Ala Leu Glu Asn Gln Gly Tyr Gln Val Glu Lys Glu Asn Lys Ala
260 265 270

Phe Glu Gln Ile Lys Asp Ser Val Ala Thr Phe Gln Thr Phe Leu Thr
275 280 285

109210 2325200

[illegible]

Val Leu Ser Leu Trp Leu Arg Glu Arg Val Tyr Glu Val Gly Ile Leu
305 310 315 320

Glu Val Val Leu Val Ser Leu Gly Ala Leu Leu Pro Ala Phe Val Ala
340 345 350

Asp Gln Ala Ser Leu Gln Asp Thr Leu Ala Lys Ala Ser Ser Leu Ser
370 375 380

Thr Ser Ile Leu Ser Phe Ala Glu Ser Tyr Val Phe Leu Val Leu Leu
385 390 395 400

Ser Cys Leu Ser Val Ala Leu Cys Phe Leu Phe Leu Phe Arg Lys Ser
405 410 415

Pro Lys Glu Ile Leu Ser Ser Ile Ser
420 425

<210> 45

<211> 459

<212> PRT

<213> streptococcus pneumoniae

<400> 45

<400> 45
Met Leu His Asn Ala Phe Ala Tyr Val Thr Arg Lys Phe Phe Lys Ser
1 5 10 15

Ile Val Ile Phe Leu Ile Ile Leu Leu Met Ala Ser Leu Ser Leu Val
20 25 30

112

Gly Leu Ser Ile Lys Gly Ala Thr Ala Lys Ala Ser Gln Glu Thr Phe
35 40 45

Lys Asn Ile Thr Asn Ser Phe Ser Met Gln Ile Asn Arg Arg Val Asn
50 55 60

Gln Gly Thr Pro Arg Gly Ala Gly Asn Ile Lys Gly Glu Asp Ile Lys
65 70 75 80

Lys Ile Thr Glu Asn Lys Ala Ile Glu Ser Tyr Val Lys Arg Ile Asn
85 90 95

Ala Ile Gly Asp Leu Thr Gly Tyr Asp Leu Ile Glu Thr Pro Glu Thr
100 105 110

Lys Lys Asn Leu Thr Ala Asp Arg Ala Lys Arg Phe Gly Ser Ser Leu
115 120 125

Met Ile Thr Gly Val Asn Asp Ser Ser Lys Glu Asp Lys Phe Val Ser
130 135 140

Gly Ser Tyr Lys Leu Val Glu Gly Glu His Leu Thr Asn Asp Asp Lys
145 150 155 160

Asp Lys Ile Leu Leu His Lys Asp Leu Ala Ala Lys His Gly Trp Lys
165 170 175

Val Gly Asp Lys Val Lys Leu Asp Ser Asn Ile Tyr Asp Ala Asp Asn
180 185 190

Glu Lys Gly Ala Lys Glu Thr Val Glu Val Thr Ile Lys Gly Leu Phe
195 200 205

Asp Gly His Asn Lys Ser Ala Val Thr Tyr Ser Gln Glu Leu Tyr Glu
210 215 220

Asn Thr Ala Ile Thr Asp Ile His Thr Ala Ala Lys Leu Tyr Gly Tyr
225 230 235 240

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113

Thr Glu Asp Thr Ala Ile Tyr Gly Asp Ala Thr Phe Phe Val Thr Ala
245 250 255

Asp Lys Asn Leu Asp Asp Val Met Lys Glu Leu Asn Gly Ile Ser Gly
260 265 270

Ile Asn Trp Lys Ser Tyr Thr Leu Val Lys Ser Ser Ser Asn Tyr Pro
275 280 285

Ala Leu Glu Gln Ser Ile Ser Gly Met Tyr Lys Met Ala Asn Leu Leu
290 295 300

Phe Trp Gly Ser Leu Ser Phe Ser Val Leu Leu Leu Ala Leu Leu Leu
305 310 315 320

Ser Leu Trp Ile Asn Ala Arg Arg Lys Glu Val Gly Ile Leu Leu Ser
325 330 335

Ile Gly Leu Lys Gln Ala Ser Ile Leu Gly Gln Phe Ile Thr Glu Ser
340 345 350

Ile Leu Ile Ala Ile Pro Ala Leu Val Ser Ala Tyr Phe Leu Ala Asn
355 360 365

Tyr Thr Ala Arg Ala Ile Gly Asn Thr Val Leu Ala Asn Val Thr Ser
370 375 380

Gly Val Ala Lys Gln Ala Ser Lys Ala Ala Gln Ala Ser Asn Leu Gly
385 390 395 400

Gly Gly Ala Glu Val Asp Gly Phe Ser Lys Thr Leu Ser Ser Leu Asp
405 410 415

Ile Ser Ile Gln Thr Ser Asp Phe Ile Ile Ile Phe Val Leu Ala Leu
420 425 430

Val Leu Val Val Leu Val Met Ala Leu Ala Ser Ser Asn Leu Leu Arg
435 440 445

0095070104601

Lys Gln Pro Lys Glu Leu Leu Leu Asp Gly Glu

450

455

<210> 46

<211> 205

<212> PRT

<213> Streptococcus pneumoniae

<400> 46

Met Ser Gln Asp Lys Gln Met Lys Ala Val Ser Pro Leu Leu Gln Arg

1

5

10

15

Val Ile Asn Ile Ser Ser Ile Val Gly Gly Val Gly Ser Leu Ile Phe

20

25

30

Cys Ile Trp Ala Tyr Gln Ala Gly Ile Leu Gln Ser Lys Glu Thr Leu

35

40

45

Ser Ala Phe Ile Gln Gln Ala Gly Ile Trp Gly Pro Pro Leu Phe Ile

50

55

60

Phe Leu Gln Ile Leu Gln Thr Val Val Pro Ile Ile Pro Gly Ala Leu

65

70

75

80

Thr Ser Val Ala Gly Val Phe Ile Tyr Gly His Ile Ile Gly Thr Ile

85

90

95

Tyr Asn Tyr Ile Gly Ile Val Ile Gly Cys Ala Ile Ile Phe Tyr Leu

100

105

110

Val Arg Leu Tyr Gly Ala Ala Phe Val Gln Ser Val Val Ser Lys Arg

115

120

125

Thr Tyr Asp Lys Tyr Ile Asp Trp Leu Asp Lys Gly Asn Arg Phe Asp

130

135

140

00760709 012604
100270 20209200

115

Arg Phe Phe Ile Phe Met Met Ile Trp Pro Ile Ser Pro Ala Asp Phe
145 150 155 160

Leu Cys Met Leu Ala Ala Leu Thr Lys Met Ser Phe Lys Arg Tyr Met
165 170 175

Thr Ile Ile Ile Leu Thr Lys Pro Phe Thr Leu Val Val Tyr Thr Tyr
180 185 190

Gly Leu Thr Tyr Ile Ile Asp Phe Phe Trp Gln Met Leu
195 200 205

<210> 47

<211> 399

<212> PRT

<213> Streptococcus pneumoniae

<400> 47

Met Arg Asn Met Trp Val Val Ile Lys Glu Thr Tyr Leu Arg His Val
1 5 10 15

Glu Ser Trp Ser Phe Phe Phe Met Val Ile Ser Pro Phe Leu Phe Leu
20 25 30

Gly Ile Ser Val Gly Ile Gly His Leu Gln Gly Ser Ser Met Ala Lys
35 40 45

Asn Asn Lys Val Ala Val Val Thr Thr Val Pro Ser Val Ala Glu Gly
50 55 60

Leu Lys Asn Val Asn Gly Val Asn Phe Asp Tyr Lys Asp Glu Ala Ser
65 70 75 80

Ala Lys Glu Ala Ile Lys Glu Glu Lys L u Lys Gly Tyr Leu Thr Ile
85 90 95

0076097 04504

116

Asp Gln Glu Asp Ser Val Leu Lys Ala Val Tyr His Gly Glu Thr Ser
100 105 110

Leu Glu Asn Gly Ile Lys Phe Glu Val Thr Gly Thr Leu Asn Glu Leu
115 120 125

Gln Asn Gln Leu Asn Arg Ser Thr Ala Ser Leu Ser Gln Glu Gln Glu
130 135 140

Lys Arg Leu Ala Gln Thr Ile Gln Phe Thr Glu Lys Ile Asp Glu Ala
145 150 155 160

Lys Glu Asn Lys Lys Phe Ile Gln Thr Ile Ala Ala Gly Ala Leu Gly
165 170 175

Phe Phe Leu Tyr Met Ile Leu Ile Thr Tyr Ala Gly Val Thr Ala Gln
180 185 190

Glu Val Ala Ser Glu Lys Gly Thr Lys Ile Met Glu Val Val Phe Ser
195 200 205

Ser Ile Arg Ala Ser His Tyr Phe Tyr Ala Arg Met Met Ala Leu Phe
210 215 220

Leu Val Ile Leu Thr His Ile Gly Ile Tyr Val Val Gly Gly Leu Ala
225 230 235 240

Ala Val Leu Leu Phe Lys Asp Leu Pro Phe Leu Ala Gln Ser Gly Ile
245 250 255

Leu Asp His Leu Gly Asp Ala Ile Ser Leu Asn Thr Leu Leu Phe Ile
260 265 270

Leu Ile Ser Leu Phe Met Tyr Val Val Leu Ala Ala Phe Leu Gly Ser
275 280 285

Met Val Ser Arg Pro Glu Asp Ser Gly Lys Ala Leu Ser Pro Leu Met
290 295 300

00769787 043604

117

Ile Leu Ile Met Gly Gly Phe Phe Gly Val Thr Ala Leu Gly Ala Ala
305 310 315 320

Gly Asp Asn Leu Leu Leu Lys Ile Gly Ser Tyr Ile Pro Phe Ile Ser
325 330 335

Thr Phe Phe Met Pro Phe Arg Thr Ile Asn Asp Tyr Ala Gly Gly Ala
340 345 350

Glu Ala Trp Ile Ser Leu Ala Ile Thr Val Ile Phe Ala Val Val Ala
355 360 365

Thr Gly Phe Ile Gly Arg Met Tyr Ala Ser Leu Val Leu Gln Thr Asp
370 375 380

Asp Leu Gly Ile Trp Lys Thr Phe Lys Arg Ala Leu Ser Tyr Lys
385 390 395

<210> 48

<211> 438

<212> PRT

<213> Streptococcus pneumoniae

<400> 48

Met Thr Glu Thr Ile Lys Leu Met Lys Ala His Thr Ser Val Arg Arg
1 5 10 15

Phe Lys Glu Gln Glu Ile Pro Gln Val Asp Leu Asn Glu Ile Leu Thr
20 25 30

Ala Ala Gln Met Ala Ser Ser Trp Lys Asn Phe Gln Ser Tyr Ser Val
35 40 45

Ile Val Val Arg Ser Gln Glu Lys Lys Asp Ala Leu Tyr Glu Leu Val
50 55 60

00759707 043604

118

Pro Gln Glu Ala Ile Arg Gln Ser Ala Val Phe Leu Leu Phe Val Gly
65 70 75 80

Asp Leu Asn Arg Ala Glu Lys Gly Ala Arg Leu His Thr Asp Thr Phe
85 90 95

Gln Pro Gln Gly Val Glu Gly Leu Leu Ile Ser Ser Val Asp Ala Ala
100 105 110

Leu Ala Gly Gln Asn Ala Leu Leu Ala Ala Glu Ser Leu Gly Tyr Gly
115 120 125

Gly Val Ile Ile Gly Leu Val Arg Tyr Lys Ser Glu Glu Val Ala Glu
130 135 140

Leu Phe Asn Leu Pro Asp Tyr Thr Tyr Ser Val Phe Gly Met Ala Leu
145 150 155 160

Gly Val Pro Asn Gln His His Asp Met Lys Pro Arg Leu Pro Leu Glu
165 170 175

Asn Val Val Phe Glu Glu Glu Tyr Gln Glu Gln Ser Thr Glu Ala Ile
180 185 190

Gln Ala Tyr Asp Arg Val Gln Ala Asp Tyr Ala Gly Ala Arg Ala Thr
195 200 205

Thr Ser Trp Ser Gln Arg Leu Ala Glu Gln Phe Gly Gln Ala Glu Pro
210 215 220

Ser Ser Thr Arg Lys Asn Leu Glu Gln Lys Lys Leu Leu Met Leu Lys
225 230 235 240

Leu Ile Ala Ile Val Gly Thr Asn Ser Lys Arg Ser Thr Asn Arg Gln
245 250 255

Leu Leu Gln Tyr Met Gln Lys His Phe Thr Asp Lys Ala Glu Ile Glu
260 265 270

00760707 04504

Leu Val Glu Ile Lys Ala Il Pro Val Phe Asn Lys Pro Ala Asp Lys
 275 280 285

Gln Val Pro Ala Glu Ile Leu Glu Ile Ala Ala Lys Ile Glu Glu Ala
 290 295 300

Asp Gly Val Ile Ile Gly Thr Pro Glu Tyr Asp His Ser Ile Pro Ala
 305 310 315 320

Val Leu Met Ser Ala Leu Ala Trp Leu Ser Tyr Gly Ile Tyr Pro Leu
 325 330 335

Leu Asn Lys Pro Ile Met Ile Thr Gly Ala Ser Tyr Gly Thr Leu Gly
 340 345 350

Ser Ser Arg Ala Gln Leu Gln Leu Arg Gln Ile Leu Asn Ala Pro Glu
 355 360 365

Ile Lys Ala Asn Val Leu Pro Asp Glu Phe Leu Leu Ser His Ser Leu
 370 375 380

Gln Ala Phe Asn Pro Ser Gly Asp Leu Val Asp Leu Asp Val Ile Lys
 385 390 395 400

Lys Leu Asp Ala Ile Phe Asp Asp Phe Arg Ile Phe Val Lys Ile Thr
 405 410 415

Glu Lys Leu Arg Asn Ala Gln Glu Leu Leu Arg Lys Asp Ala Glu Asp
 420 425 430

Phe Asp Trp Glu Asn Leu
 435

00769797-042604

Thr Ile Val Pro Ala Val Asn Gln Val Arg Leu Ala Pro Gly Val Tyr
165 170 175

121

Gln Asp Gln Val Val Ala Tyr Cys Arg Glu Lys Gly Ile Leu Leu Glu
180 185 190

Ala Trp Gly Pro Phe Gly Gln Gly Glu Leu Phe Asp Ser Lys Gln Val
195 200 205

Gln Glu Ile Ala Ala Asn His Gly Lys Ser Val Ala Gln Ile Ala Leu
210 215 220

Ala Trp Ser Leu Ala Glu Gly Phe Leu Pro Leu Pro Lys Ser Val Thr
225 230 235 240

Thr Ser Arg Ile Gln Ala Asn Leu Asp Cys Phe Gly Ile Glu Leu Ser
245 250 255

His Glu Glu Arg Glu Thr Leu Lys Thr Ile Ala Val Gln Ser Gly Ala
260 265 270

Pro Arg Val Asp Asp Val Asp Phe
275 280

<210> 50

<211> 266

<212> PRT

<213> Streptococcus pneumoniae

<400> 50

Met Arg Cys Lys Met Leu Asp Pro Ile Ala Ile Gln Leu Gly Pro Leu
1 5 10 15

Ala Ile Arg Trp Tyr Ala Leu Cys Ile Val Thr Gly Leu Ile Leu Ala
20 25 30

Val Tyr Leu Thr Met Lys Glu Ala Pro Arg Lys Lys Ile Ile Pro Asp
35 40 45

K09270-2929260

122

Asp Ile Leu Asp Phe Ile Leu Val Ala Phe Pro Leu Ala Ile Leu Gly
50 55 60

Ala Arg Leu Tyr Tyr Val Ile Phe Arg Phe Asp Tyr Tyr Ser Gln Asn
65 70 75 80

Leu Gly Glu Ile Phe Ala Ile Trp Asn Gly Gly Leu Ala Ile Tyr Gly
85 90 95

Gly Leu Ile Thr Gly Ala Leu Val Leu Tyr Ile Phe Ala Asp Arg Lys
100 105 110

Leu Ile Asn Thr Trp Asp Phe Leu Asp Ile Ala Ala Pro Ser Val Met
115 120 125

Ile Ala Gln Ser Leu Gly Arg Trp Gly Asn Phe Phe Asn Gln Glu Ala
130 135 140

Tyr Gly Ala Thr Val Asp Asn Leu Asp Tyr Leu Pro Gly Phe Ile Arg
145 150 155 160

Asp Gln Met Tyr Ile Glu Gly Ser Tyr Arg Gln Pro Thr Phe Leu Tyr
165 170 175

Glu Ser Leu Trp Asn Leu Leu Gly Phe Ala Leu Ile Leu Ile Phe Arg
180 185 190

Arg Lys Trp Lys Ser Leu Arg Arg Gly His Ile Thr Ala Phe Tyr Leu
195 200 205

Ile Trp Tyr Gly Phe Gly Arg Met Val Ile Glu Gly Met Arg Thr Asp
210 215 220

Ser Leu Met Phe Phe Gly Phe Arg Val Ser Gln Trp Leu Ser Val Val
225 230 235 240

Leu Ile Gly Leu Gly Ile Met Ile Val Ile Tyr Gln Asn Arg Lys Lys
245 250 255

00769707 01504
T09270 2026260

Ala Pro Tyr Tyr Ile Thr Glu Glu Glu Asn
260 265

<210> 51

<211> 129

<212> PRT

<213> Streptococcus pneumoniae

<400> 51

Met Gly Lys Leu Ser Ser Ile Leu Leu Gly Thr Val Ser Gly Ala Ala
1 5 10 15

Leu Ala Leu Phe Leu Thr Ser Asp Lys Gly Lys Gln Val Cys Ser Gln
20 25 30

Ala Gln Asp Phe Leu Asp Asp Leu Arg Glu Asp Pro Glu Tyr Ala Lys
35 40 45

Glu Gln Val Cys Glu Lys Leu Thr Glu Val Lys Glu Gln Ala Thr Asp
50 55 60

Phe Val Leu Lys Thr Lys Glu Gln Val Glu Ser Gly Glu Ile Thr Val
65 70 75 80

Asp Ser Ile Leu Ala Gln Thr Lys Ser Tyr Ala Phe Gln Ala Thr Glu
85 90 95

Ala Ser Lys Asn Gln Leu Asn Asn Leu Lys Glu Gln Trp Gln Glu Lys
100 105 110

Ala Glu Ala Leu Asp Asp Ser Glu Glu Ile Val Ile Asp Ile Thr Glu
115 120 125

Glu

00769787-012504

<210> 52

<211> 205

<212> PRT

<213> Streptococcus pneumoniae

<400> 52

Met Lys Thr Lys Leu Ile Phe Trp Gly Ser Met Leu Phe Leu Leu Ser
 1 5 10 15

Leu Ser Ile Leu Leu Thr Ile Tyr Leu Ala Trp Ile Phe Tyr Pro Met
 20 25 30

Glu Ile Gln Trp Leu Asn Leu Thr Asn Arg Val Tyr Leu Lys Pro Glu
 35 40 45

Thr Ile Gln Tyr Asn Phe His Ile Leu Met Asn Tyr Leu Thr Asn Pro
 50 55 60

Phe Ser Gln Val Leu Gln Met Pro Asp Phe Arg Ser Ser Ala Ala Gly
 65 70 75 80

Leu His His Phe Ala Val Val Lys Asn Leu Phe His Leu Val Gln Leu
 85 90 95

Val Ala Leu Val Thr Leu Pro Ser Phe Tyr Val Phe Val Asn Arg Ile
 100 105 110

Val Lys Lys Asp Phe Leu Ser Leu Tyr Arg Lys Ser Leu Leu Ala Leu
 115 120 125

Val Val Leu Pro Val Met Ile Gly Leu Gly Gly Val Leu Ile Gly Phe
 130 135 140

Asp Gln Phe Phe Thr Leu Phe His Gln Ile Leu Phe Val Gly Asp Asp
 145 150 155 160

Thr Trp Leu Phe Asp Pro Ala Lys Asp Pro Val Ile Met Ile Leu Pro
 165 170 175

00360707-045604

Glu Thr Phe Phe Leu His Ala Phe Leu Leu Phe Phe Ala Leu Tyr Glu
 180 185 190

Asn Phe Phe Gly Tyr Leu Tyr Leu Lys Ser Arg Arg Lys
 195 200 205

<210> 53

<211> 637

<212> PRT

<213> Streptococcus pneumoniae

<400> 53

Met Thr Tyr His Phe Thr Glu Glu Tyr Asp Ile Ile Val Ile Gly Ala
 1 5 10 15

Gly His Ala Gly Val Glu Ala Ser Leu Ala Ala Ser Arg Met Gly Cys
 20 25 30

Lys Val Leu Leu Ala Thr Ile Asn Ile Glu Met Leu Ala Phe Met Pro
 35 40 45

Cys Asn Pro Ser Ile Gly Gly Ser Ala Lys Gly Ile Val Val Arg Glu
 50 55 60

Val Asp Ala Leu Gly Gly Glu Met Ala Lys Thr Ile Asp Lys Thr Tyr
 65 70 75 80

Ile Gln Met Lys Met Leu Asn Thr Gly Lys Gly Pro Ala Val Arg Ala
 85 90 95

Leu Arg Ala Gln Ala Asp Lys Glu Leu Tyr Ser Lys Glu Met Arg Lys
 100 105 110

Thr Val Glu Asn Gln Glu Asn Leu Thr Leu Arg Gln Thr Met Ile Asp
 115 120 125

00360707 04504

126

Glu Ile Leu Val Glu Asp Gly Lys Val Val Gly Val Arg Thr Ala Thr
130 135 140

His Gln Glu Tyr Ala Ala Lys Ala Val Ile Val Thr Thr Gly Thr Ala
145 150 155 160

Leu Arg Gly Glu Ile Ile Ile Gly Asp Leu Lys Tyr Ser Ser Gly Pro
165 170 175

Asn His Ser Leu Ala Ser Ile Asn Leu Ala Asp Asn Leu Lys Glu Leu
180 185 190

Gly Leu Glu Ile Gly Arg Phe Lys Thr Gly Thr Pro Pro Arg Val Lys
195 200 205

Ala Ser Ser Ile Asn Tyr Asp Val Thr Glu Ile Gln Pro Gly Asp Glu
210 215 220

Val Pro Asn His Phe Ser Tyr Thr Ser Arg Asp Glu Asp Tyr Val Lys
225 230 235 240

Asp Gln Val Pro Cys Trp Leu Thr Tyr Thr Asn Gly Thr Ser His Glu
245 250 255

Ile Ile Gln Asn Asn Leu His Arg Ala Pro Met Phe Thr Gly Val Val
260 265 270

Lys Gly Val Gly Pro Arg Tyr Cys Pro Ser Ile Glu Asp Lys Ile Val
275 280 285

Arg Phe Ala Asp Lys Glu Arg His Gln Leu Phe Leu Glu Pro Glu Gly
290 295 300

Arg Asn Thr Glu Glu Val Tyr Val Gln Gly Leu Ser Thr Ser Leu Pro
305 310 315 320

Glu Asp Val Gln Arg Asp Leu Val His Ser Ile Lys Gly Leu Glu Asn
325 330 335

00969707-04501

Ala Glu Met Met Arg Thr Gly Tyr Ala Ile Glu Tyr Asp Met Val Leu
340 345 350

Pro His Gln Leu Arg Ala Thr Leu Glu Thr Lys Lys Ile Ser Gly Leu
355 360 365

Phe Thr Ala Gly Gln Thr Asn Gly Thr Ser Gly Tyr Glu Glu Ala Ala
370 375 380

Gly Gln Gly Ile Ile Ala Gly Ile Asn Ala Ala Leu Lys Ile Gln Gly
385 390 395 400

Lys Pro Glu Leu Ile Leu Lys Arg Ser Asp Gly Tyr Ile Gly Val Met
405 410 415

Ile Asp Asp Leu Val Thr Lys Gly Thr Ile Glu Pro Tyr Arg Leu Leu
420 425 430

Thr Ser Arg Ala Glu Tyr Arg Leu Ile Leu Arg His Asp Asn Ala Asp
435 440 445

Met Arg Leu Thr Glu Met Gly Arg Glu Ile Gly Leu Val Asp Asp Glu
450 455 460

Arg Trp Ala Arg Phe Glu Ile Lys Lys Asn Gln Phe Asp Asn Glu Met
465 470 475 480

Lys Arg Leu Asp Ser Ile Lys Leu Lys Pro Val Lys Glu Thr Asn Ala
485 490 495

Lys Val Glu Glu Met Gly Phe Lys Pro Leu Thr Asp Ala Val Thr Ala
500 505 510

Lys Glu Phe Leu Arg Arg Pro Glu Val Ser Tyr Gln Asp Val Val Ala
515 520 525

Phe Ile Gly Pro Ala Ala Glu Asp Leu Asp Asp Lys Ile Ile Glu Leu
530 535 540

00769767-03501

Ile Glu Thr Glu Ile Lys Tyr Glu Gly Tyr Ile Ser Lys Ala Met Asp
545 550 555 560

Gln Val Ala Lys Met Lys Arg Met Glu Glu Lys Arg Ile Pro Ala Asn
565 570 575

Ile Asp Trp Asp Asp Ile Asp Ser Ile Ala Thr Glu Ala Arg Gln Lys
580 585 590

Phe Lys Leu Ile Asn Pro Glu Thr Ile Gly Gln Ala Ser Arg Ile Ser
595 600 605

Gly Val Asn Pro Ala Asp Ile Ser Ile Leu Met Val Tyr Leu Glu Gly
610 615 620

Lys Asn Arg Ser Ile Ser Lys Thr Leu Gln Lys Ser Lys
625 630 635

<210> 54

<211> 185

<212> PRT

<213> Streptococcus pneumoniae

<400> 54

Met Thr Lys Gln Val Leu Leu Val Asp Asp Glu Glu His Ile Leu Lys
1 5 10 15

Leu Leu Asp Tyr His Leu Ser Lys Glu Gly Phe Ser Thr Gln Leu Val
20 25 30

Thr Asn Gly Arg Lys Ala Leu Ala Leu Ala Glu Thr Glu Pro Phe Asp
35 40 45

Phe Ile Leu L u Asp Ile Met Leu Pro Gln Leu Asp Gly Met Glu Val
50 55 60

00760787 042604

129

Cys Lys Arg Leu Arg Ala Lys Gly Val Lys Thr Pro Ile Met Met Val
65 70 75 80

Ser Ala Lys Ser Asp Glu Phe Asp Lys Val Leu Ala Leu Glu Leu Gly
85 90 95

Ala Asp Asp Tyr Leu Thr Lys Pro Phe Ser Pro Arg Glu Leu Leu Ala
100 105 110

Arg Val Lys Ala Val Leu Arg Arg Thr Lys Gly Glu Gln Glu Gly Asp
115 120 125

Asp Ser Asp Asn Ile Ala Asp Asp Ser Trp Leu Phe Gly Thr Leu Lys
130 135 140

Val Tyr Pro Glu Arg His Glu Val Tyr Lys Ala Asn Lys Leu Leu Ser
145 150 155 160

Leu Thr Pro Lys Glu Phe Glu Ser Asp Lys Asn Pro Phe Phe Glu Val
165 170 175

Phe Lys Val Ser Lys Val Thr Ala Gln
180 185

<210> 55

<211> 478

<212> PRT

<213> Streptococcus pneumoniae

<400> 55

Met Thr Thr Phe Lys Asp Gly Phe Leu Trp Gly Gly Ala Val Ala Ala
1 5 10 15

His Gln Leu Glu Gly Gly Trp Gln Glu Gly Gly Lys Gly Ile Ser Val
20 25 30

00760707-042604

130

Ala Asp Val Met Thr Ala Gly Arg His Gly Val Ala Arg Glu Ile Thr
35 40 45

Leu Gly Val Leu Glu Gly Lys Tyr Tyr Pro Asn His Glu Ala Ile Asp
50 55 60

Phe Tyr His Arg Tyr Lys Glu Asp Ile Ala Leu Phe Ala Glu Met Gly
65 70 75 80

Phe Lys Cys Phe Arg Thr Ser Ile Ala Trp Thr Arg Ile Phe Pro Lys
85 90 95

Gly Asp Glu Leu Glu Pro Asn Glu Glu Gly Leu Gln Phe Tyr Asp Asn
100 105 110

Leu Phe Asp Glu Cys Leu Lys Asn Gly Ile Glu Pro Val Ile Thr Leu
115 120 125

Ser His Phe Glu Met Pro Tyr His Leu Val Thr Glu Tyr Gly Gly Trp
130 135 140

Lys Asn Arg Lys Leu Ile Asp Phe Phe Ala Arg Phe Ala Glu Val Val
145 150 155 160

Phe Lys Arg Tyr Lys Asp Lys Val Lys Tyr Trp Met Thr Phe Asn Glu
165 170 175

Ile Asn Asn Gln Ala Asn Tyr Gln Glu Asp Phe Ala Pro Phe Thr Asn
180 185 190

Ser Gly Ile Val Tyr Glu Glu Gly Asp Asn Arg Glu Ala Ile Met Tyr
195 200 205

Gln Ala Ala His Tyr Glu Leu Val Ala Ser Ala Arg Ala Val Lys Ile
210 215 220

Gly His Glu Ile Asn Pro Asp Phe Gln Ile Gly Cys Met Ile Ala Met
225 230 235 240

00269767-042604

131

Cys Pro Ile Tyr Pro Val Thr Cys Asn Pro Lys Asp Ile Leu Met Ala
245 250 255

Met Lys Ala Met Gln Lys Arg Tyr Tyr Phe Ala Asp Val His Val Leu
260 265 270

Gly Lys Tyr Pro Glu His Ile Phe Lys Tyr Trp Glu Arg Lys Gly Ile
275 280 285

Ser Val Asp Phe Thr Ala Gln Asp Lys Glu Asp Leu Leu Gly Gly Thr
290 295 300

Val Asp Tyr Ile Gly Phe Ser Tyr Tyr Met Ser Phe Ala Ile Asp Ser
305 310 315 320

His Arg Glu Asn Asn Pro Tyr Phe Asp Tyr Leu Glu Thr Glu Asp Leu
325 330 335

Val Lys Asn Asn Tyr Val Lys Ala Ser Glu Trp Glu Trp Gln Ile Asp
340 345 350

Pro Glu Gly Leu Arg Tyr Ala Leu Asn Trp Phe Thr Asp His Tyr His
355 360 365

Leu Pro Leu Phe Ile Val Glu Asn Gly Phe Gly Ala Ile Asp Gln Val
370 375 380

Ala Ala Asp Gly Met Val His Asp Asp Tyr Arg Ile Glu Tyr Leu Gly
385 390 395 400

Ala His Ile Arg Glu Met Lys Lys Ala Val Val Glu Asp Gly Val Asp
405 410 415

Leu Met Gly Tyr Thr Pro Trp Gly Cys Ile Asp Leu Val Ser Ala Gly
420 425 430

Thr Gly Glu Met Arg Lys Arg Tyr Gly Phe Ile Tyr Val Asp Lys Asp
435 440 445

009609-01301

Asp Asn Gly Lys Gly Ser Tyr Asn Arg Ser Pro Lys Lys Ser Phe Gly
 450 455 460

Trp Tyr Lys Glu Val Ile Ser Ser Asn Gly Glu Ser Val Glu
 465 470 475

<210> 56

<211> 448

<212> PRT

<213> Streptococcus pneumoniae

<400> 56

Met Asp Gln Gln Asn Gly Leu Phe Gly Phe Leu Glu Asn His Val Met
 1 5 10 15

Gly Pro Met Gly Lys Leu Ala Gln Phe Lys Val Val Arg Ala Ile Thr
 20 25 30

Ala Ala Gly Met Ala Ala Val Pro Phe Thr Ile Val Gly Ser Met Phe
 35 40 45

Leu Val Phe Ser Ile Leu Pro Gln Ala Phe Ser Phe Trp Pro Ile Val
 50 55 60

Ala Asp Ile Phe Ser Ala Ser Phe Asp Lys Phe Thr Ser Leu Tyr Met
 65 70 75 80

Val Ala Asn Tyr Ala Thr Met Gly Ser Leu Ser Leu Tyr Phe Val Leu
 85 90 95

Ser Leu Ala Tyr Glu Leu Thr Lys Ile Tyr Ala Glu Glu Glu Glu Leu
 100 105 110

Asn Met Asn Pro Leu Asn Gly Ala Leu Leu Ala Leu Met Ala Phe Val
 115 120 125

0096097 02501

1. The first part of the paper is devoted to the study of the asymptotic behavior of the solutions of the system (1) as $t \rightarrow \infty$. It is shown that the solutions of the system (1) are bounded and tend to zero as $t \rightarrow \infty$ if the matrix A is stable. The second part of the paper is devoted to the study of the asymptotic behavior of the solutions of the system (1) as $t \rightarrow \infty$ if the matrix A is not stable. It is shown that the solutions of the system (1) are unbounded and tend to infinity as $t \rightarrow \infty$ if the matrix A is not stable.

Thr Ser Leu Lys Glu Gly Ala Val Ile Ala Asp Gly Trp Ala Met Gly
145 150 155 160

Asn Val Val Ala Arg Phe Gly Thr Thr Gly Ile Phe Thr Ala Ile Ile
165 170 175

Met Ala Ile Val Thr Val Leu Ile Tyr Arg Met Cys Val Lys His Asn
180 185 190

Trp Val Ile Lys Met Pro Glu Ala Val Pro Glu Gly Val Ser Arg Gly
195 200 205

Phe Thr Ala Leu Val Pro Gly Phe Val Val Ala Phe Val Val Ile Phe
210 215 220

Ile Asn Gly Leu Leu Val Ala Met Gly Thr Asp Ile Phe Lys Val Ile
225 230 235 240

Ala Ile Pro Phe Gly Phe Val Ser Asn Leu Thr Asn Ser Trp Ile Gly
245 250 255

Leu Met Ile Ile Tyr Leu Leu Thr Gln Leu Leu Trp Ile Val Gly Ile
260 265 270

His Gly Ala Asn Ile Val Phe Ala Phe Val Ser Pro Ile Ala Leu Ala
275 280 285

Asn Met Ala Glu Asn Ala Ala Gly Gly His Phe Ala Val Ala Gly Glu
290 295 300

Phe Ser Asn Met Phe Val Ile Ala Gly Gly Ser Gly Ala Thr Leu Gly
305 310 315 320

Leu Cys Leu Tyr Ile Ala Phe Ala Ser Lys Ser Glu Gln Leu Lys Ala
325 330 335

134

Ile Gly Arg Ala Ser Val Val Pro Ala Leu Phe Asn Ile Asn Glu Pro
340 345 350

Leu Ile Phe Gly Leu Pro Ile Ile Tyr Asn Pro Ala Leu Ala Ile Pro
355 360 365

Phe Ile Leu Ala Pro Met Val Thr Ala Thr Ile Tyr Tyr Val Ala Asn
370 375 380

Ser Leu Asn Phe Ile Lys Pro Ile Ile Ala Gln Val Pro Trp Pro Thr
385 390 395 400

Pro Val Gly Ile Gly Ala Phe Leu Gly Thr Ala Asp Leu Arg Ala Val
405 410 415

Leu Val Ala Leu Val Cys Ala Phe Ala Ala Phe Leu Val Tyr Leu Pro
420 425 430

Phe Ile Arg Val Tyr Asp Gln Lys Leu Val Lys Glu Glu Gln Gly Ile
435 440 445

<210> 57

<211> 657

<212> PRT

<213> Streptococcus pneumoniae

<400> 57

Met Lys Lys Phe Tyr Val Ser Pro Ile Phe Pro Ile Leu Val Gly Leu
1 5 10 15

Ile Ala Phe Gly Val Leu Ser Thr Phe Ile Ile Phe Val Asn Asn Asn
20 25 30

Leu Leu Thr Val Leu Ile Leu Phe Leu Phe Val Gly Gly Tyr Val Phe
35 40 45

00159797 015601

135

Leu Phe Lys Lys Leu Arg Val His Tyr Thr Arg Ser Asp Val Glu Gln
50 55 60

Ile Gln Tyr Val Asn His Gln Ala Glu Glu Ser Leu Thr Ala Leu Leu
65 70 75 80

Glu Gln Met Pro Val Gly Val Met Lys Leu Asn Leu Ser Ser Gly Glu
85 90 95

Val Glu Trp Phe Asn Pro Tyr Ala Glu Leu Ile Leu Thr Lys Glu Asp
100 105 110

Gly Asp Phe Asp Leu Glu Ala Val Gln Thr Ile Ile Lys Ala Ser Val
115 120 125

Gly Asn Pro Ser Thr Tyr Ala Lys Leu Gly Glu Lys Arg Tyr Ala Val
130 135 140

His Met Asp Ala Ser Ser Gly Val Leu Tyr Phe Val Asp Val Ser Arg
145 150 155 160

Glu Gln Ala Ile Thr Asp Glu Leu Val Thr Ser Arg Pro Val Ile Gly
165 170 175

Ile Val Ser Val Asp Asn Tyr Asp Asp Leu Glu Asp Glu Thr Ser Glu
180 185 190

Ser Asp Ile Ser Gln Ile Asn Ser Phe Val Ala Asn Phe Ile Ser Glu
195 200 205

Phe Ser Glu Lys His Met Met Phe Ser Arg Arg Val Ser Met Asp Arg
210 215 220

Phe Tyr Leu Phe Thr Asp Tyr Thr Val Leu Glu Gly Leu Met Asn Asp
225 230 235 240

Lys Phe Ser Val Ile Asp Ala Phe Arg Glu Glu Ser Lys Gln Arg Gln
245 250 255

00769797 043604

136

Leu Pro Leu Thr Leu Ser Met Gly Phe Ser Tyr Gly Asp Gly Asn His
260 265 270

Asp Glu Ile Gly Lys Val Ala Leu Leu Asn Leu Asn Leu Ala Glu Val
275 280 285

Arg Gly Gly Asp Gln Val Val Val Lys Glu Asn Asp Glu Thr Lys Asn
290 295 300

Pro Val Tyr Phe Gly Gly Gly Ser Ala Ala Ser Ile Lys Arg Thr Arg
305 310 315 320

Thr Arg Thr Arg Ala Met Met Thr Ala Ile Ser Asp Lys Ile Arg Ser
325 330 335

Val Asp Gln Val Phe Val Val Gly His Lys Asn Leu Asp Met Asp Ala
340 345 350

Leu Gly Ser Ala Val Gly Met Gln Leu Phe Ala Ser Asn Val Ile Glu
355 360 365

Asn Ser Tyr Ala Leu Tyr Asp Glu Glu Gln Met Ser Pro Asp Ile Glu
370 375 380

Arg Ala Val Ser Phe Ile Glu Lys Glu Gly Val Thr Lys Leu Leu Ser
385 390 395 400

Val Lys Asp Ala Met Gly Met Val Thr Asn Arg Ser Leu Leu Ile Leu
405 410 415

Val Asp His Ser Lys Thr Ala Leu Thr Leu Ser Lys Glu Phe Tyr Asp
420 425 430

Leu Phe Thr Gln Thr Ile Val Ile Asp His His Arg Arg Asp Gln Asp
435 440 445

Phe Pro Asp Asn Ala Val Ile Thr Tyr Ile Glu Ser Gly Ala Ser Ser
450 455 460

006699-0360

Glu

<210> 58

<211> 235

<212> PRT

<213> Streptococcus pneumoniae

<400> 58

Met Lys Glu Lys Asn Met Trp Lys Glu Leu Leu Asn Arg Ala Gly Trp

1

5

10

15

Ile Leu Val Phe Leu Leu Ala Val Leu Leu Tyr Gln Val Pro Leu Val

20

25

30

Val Thr Ser Ile Leu Thr Leu Lys Glu Val Ala Leu Leu Gln Ser Gly

35

40

45

Leu Ile Val Ala Gly Leu Ser Ile Val Val Leu Ala Leu Phe Ile Met

50

55

60

Gly Ala Arg Lys Thr Lys Leu Ala Ser Phe Asn Phe Ser Phe Phe Arg

65

70

75

80

Ala Lys Asp Leu Ala Arg Leu Gly Leu Ser Tyr Leu Val Ile Val Gly

85

90

95

Ser Asn Ile Leu Gly Ser Ile Leu Leu Gln Leu Ser Asn Glu Thr Thr

100

105

110

Thr Ala Asn Gln Ser Gln Ile Asn Asp Met Val Gln Asn Ser Ser Leu

115

120

125

Ile Ser Ser Phe Phe Leu Leu Ala Leu Leu Ala Pro Ile Cys Glu Glu

130

135

140

Ile Leu Cys Arg Gly Ile Val Pro Lys Lys Ile Phe Arg Gly Lys Glu

145

150

155

160

Asn Leu Gly Phe Val Val Gly Thr Ile Val Phe Ala Leu Leu His Gln

165

170

175

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140

Ser Asn Ile Leu Gly Ser Ile Leu Leu Gln Leu Ser Asn Glu Thr Thr
100 105 110

Thr Ala Asn Gln Ser Gln Ile Asn Asp Met Val Gln Asn Ser Ser Leu
115 120 125

Ile Ser Ser Phe Phe Leu Leu Ala Leu Leu Ala Pro Ile Cys Glu Glu
130 135 140

Ile Leu Cys Arg Gly Ile Val Pro Lys Lys Ile Phe Arg Gly Lys Glu
145 150 155 160

Asn Leu Gly Phe Val Val Gly Thr Ile Val Phe Ala Leu Leu His Gln
165 170 175

Pro Ser Asn Leu Pro Ser Leu Leu Ile Tyr Gly Gly Met Ser Thr Val
180 185 190

Leu Ser Trp Thr Ala Tyr Lys Thr Gln Arg Leu Glu Met Ser Ile Leu
195 200 205

Leu His Met Ile Val Asn Gly Ile Ala Phe Cys Leu Leu Ala Leu Val
210 215 220

Val Ile Met Ser Arg Thr Leu Gly Ile Ser Val
225 230 235

<210> 60

<211> 533

<212> PRT

<213> Streptococcus pneumoniae

<400> 60

Met Asp Thr Gln Lys Ile Glu Ala Ala Val Lys Met Ile Ile Glu Ala

1

5

10

15

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F09270 2029260

141

Val Gly Glu Asp Ala Asn Arg Glu Gly Leu Gln Glu Thr Pro Ala Arg
20 25 30

Val Ala Arg Met Tyr Gln Glu Ile Phe Ser Gly Leu Gly Gln Thr Ala
35 40 45

Glu Glu His Leu Ser Lys Ser Phe Glu Ile Ile Asp Asp Asn Met Val
50 55 60

Val Glu Lys Asp Ile Phe Phe His Thr Met Cys Glu His His Phe Leu
65 70 75 80

Pro Phe Tyr Gly Arg Ala His Ile Ala Tyr Ile Pro Asp Gly Arg Val
85 90 95

Ala Gly Leu Ser Lys Leu Ala Arg Thr Val Glu Val Tyr Ser Lys Lys
100 105 110

Pro Gln Ile Gln Glu Arg Leu Asn Ile Glu Val Ala Asp Ala Leu Met
115 120 125

Asp Tyr Leu Gly Ala Lys Gly Ala Phe Val Val Ile Glu Ala Glu His
130 135 140

Met Cys Met Ser Met Arg Gly Val Arg Lys Pro Gly Thr Ala Thr Leu
145 150 155 160

Thr Thr Val Ala Arg Gly Leu Phe Glu Thr Asp Lys Asp Leu Arg Asp
165 170 175

Gln Ala Tyr Arg Leu Met Gly Leu Met Lys Asp Leu Phe Leu Lys Arg
180 185 190

Lys Gln Ala Phe Arg Lys Glu Cys Leu Gly Tyr Leu Arg Tyr Val Leu
195 200 205

Asn Asp His Phe Val Leu Phe Leu Leu Val Leu Leu Gly Phe Leu Ala
210 215 220

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142

Tyr Gln Tyr Ser Gln Leu Leu Gln His Phe Pro Glu Asn His Trp Pro
225 230 235 240

Ile Leu Leu Phe Val Gly Ile Thr Ser Val Leu Leu Leu Leu Trp Gly
245 250 255

Gly Thr Ala Thr Tyr Met Glu Ala Pro Asp Lys Leu Phe Leu Leu Val
260 265 270

Gly Glu Glu Glu Ile Lys Leu His Leu Lys Arg Gln Thr Gly Ile Ser
275 280 285

Leu Val Phe Trp Leu Phe Val Gln Thr Leu Phe Leu Leu Leu Phe Ala
290 295 300

Pro Leu Phe Leu Ala Met Gly Tyr Gly Leu Pro Val Phe Leu Leu Tyr
305 310 315 320

Val Leu Leu Leu Gly Val Gly Lys Tyr Phe His Phe Cys Gln Lys Ala
325 330 335

Ser Lys Phe Phe Thr Glu Thr Gly Leu Asp Trp Asp Tyr Val Ile Ser
340 345 350

Gln Glu Ser Lys Arg Lys Gln Val Leu Leu Arg Phe Phe Ala Leu Phe
355 360 365

Thr Gln Val Lys Gly Ile Ser Asn Ser Val Lys Arg Arg Ala Tyr Leu
370 375 380

Asp Phe Ile Leu Lys Ala Val Gln Lys Val Pro Gly Lys Ile Trp Gln
385 390 395 400

Asn Leu Tyr Leu Arg Ser Tyr Leu Arg Asn Gly Asp Leu Phe Ala Leu
405 410 415

Ser Leu Arg Leu Leu Leu Leu Ser Leu Leu Ala Gln Val Phe Ile Glu
420 425 430

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Gln Ala Trp Ile Ala Thr Ala Val Val Val Leu Phe Asn Tyr Leu Leu
435 440 445

Leu Phe Gln Leu Leu Ala Leu Tyr His Ala Phe Asp Tyr Gln Tyr Leu
450 455 460

Thr Gln Leu Phe Pro Leu Asp Lys Gly Gln Lys Glu Lys Gly Leu Gln
465 470 475 480

Glu Val Val Arg Gly Leu Thr Ser Phe Val Leu Leu Val Glu Leu Val
485 490 495

Val Gly Leu Ile Thr Phe Gln Glu Lys Leu Ala Leu Leu Ala Leu Leu
500 505 510

Gly Ala Gly Leu Val Leu Leu Val Leu Tyr Leu Pro Tyr Gln Val Lys
515 520 525

Arg Gln Met Gln Asp
530

<210> 61

<211> 398

<212> PRT

<213> Streptococcus pneumoniae

<400> 61

Met Arg Lys Ser Ile Val Leu Ala Ala Asp Asn Ala Tyr Leu Ile Pro
1 5 10 15

Leu Glu Thr Thr Ile Lys Ser Val Leu Tyr His Asn Arg Asp Val Asp
20 25 30

Phe Tyr Ile Leu Asn Ser Asp Ile Ala Pro Glu Trp Phe Lys Leu Leu
35 40 45

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109670 109670

144

Gly Arg Lys Met Glu Val Val Asn Ser Thr Ile Arg Ser Val His Ile
50 55 60

Asp Lys Glu Leu Phe Glu Ser Tyr Lys Thr Gly Pro His Ile Asn Tyr
65 70 75 80

Ala Ser Tyr Phe Arg Phe Phe Ala Thr Glu Val Val Glu Ser Asp Arg
85 90 95

Val Leu Tyr Leu Asp Ser Asp Ile Ile Val Thr Gly Glu Leu Ala Thr
100 105 110

Leu Phe Glu Ile Asp Leu Lys Gly Tyr Ser Ile Gly Ala Val Asp Asp
115 120 125

Val Tyr Ala Tyr Glu Gly Arg Lys Ser Gly Phe Asn Thr Gly Met Leu
130 135 140

Leu Met Asp Val Ala Lys Trp Lys Glu His Ser Ile Val Asn Ser Leu
145 150 155 160

Leu Glu Leu Ala Ala Glu Gln Asn Gln Val Val His Leu Gly Asp Gln
165 170 175

Ser Ile Leu Asn Ile Tyr Phe Glu Asp Asn Trp Leu Ala Leu Asp Lys
180 185 190

Thr Tyr Asn Tyr Met Val Gly Ile Asp Ile Tyr His Leu Ala Gln Glu
195 200 205

Cys Glu Arg Leu Asp Asp Asn Pro Pro Thr Ile Val His Tyr Ala Ser
210 215 220

His Asp Lys Pro Trp Asn Thr Tyr Ser Ile Ser Arg Leu Arg Glu Leu
225 230 235 240

Trp Trp Val Tyr Arg Asp Leu Asp Trp Ser Glu Ile Ala Phe Gln Arg
245 250 255

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[illegible]

15

146

Ser Phe Leu Leu Phe Ile Tyr Val Leu Gly S r Arg Ile Ile Leu Pro
20 25 30

Phe Val Asp Leu Asn Thr Lys Asp Phe Leu Gly Gly Ser Thr Ala Tyr
35 40 45

Leu Ala Phe Ser Ala Ala Leu Thr Gly Gly Asn Leu Arg Ser Leu Ser
50 55 60

Ile Phe Ser Val Gly Leu Ser Pro Trp Met Ser Ala Met Ile Leu Trp
65 70 75 80

Gln Met Phe Ser Phe Ser Lys Arg Leu Gly Leu Thr Ser Thr Ser Ile
85 90 95

Glu Ile Gln Asp Arg Arg Lys Met Tyr Leu Thr Leu Leu Ile Ala Val
100 105 110

Ile Gln Ser Leu Ala Val Ser Leu Arg Leu Pro Val Gln Ser Ser Tyr
115 120 125

Ser Ala Ile Leu Val Val Leu Met Asn Thr Ile Leu Leu Ile Ala Gly
130 135 140

Thr Phe Phe Leu Val Trp Leu Ser Asp Leu Asn Ala Ser Met Gly Ile
145 150 155 160

Gly Gly Ser Ile Val Ile Leu Leu Ser Ser Met Val Leu Asn Ile Pro
165 170 175

Gln Asp Val Leu Glu Thr Phe Gln Thr Val His Ile Pro Thr Gly Ile
180 185 190

Ile Val Leu Leu Ala Leu Leu Thr Leu Val Phe Ser Tyr Leu Leu Ala
195 200 205

Leu Met Tyr Arg Ala Arg Tyr Leu Val Pro Val Asn Lys Ile Gly Leu
210 215 220

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F09270-202960

[illegible]

Tyr Arg Pro Leu Ile
405

<210> 63

<211> 763

<212> PRT

<213> Streptococcus pneumoniae

<400> 63

Met Ser Ser Leu Ser Asp Gln Glu Leu Val Ala Lys Thr Val Glu Phe

1 5 10 15

Arg Gln Arg Leu Ser Glu Gly Glu Ser Leu Asp Asp Ile Leu Val Glu

20 25 30

Ala Phe Ala Val Val Arg Glu Ala Asp Lys Arg Ile Leu Gly Met Phe

35 40 45

Pro Tyr Asp Val Gln Val Met Gly Ala Ile Val Met His Tyr Gly Asn

50 55 60

Val Ala Glu Met Asn Thr Gly Glu Gly Lys Thr Leu Thr Ala Thr Met

65 70 75 80

Pro Val Tyr Leu Asn Ala Phe Ser Gly Glu Gly Val Met Val Val Thr

85 90 95

Pro Asn Glu Tyr Leu Ser Lys Arg Asp Ala Glu Glu Met Gly Gln Val

100 105 110

Tyr Arg Phe Leu Gly Leu Thr Ile Gly Val Pro Phe Thr Glu Asp Pro

115 120 125

Lys Lys Glu Met Lys Ala Glu Glu Lys Lys Leu Ile Tyr Ala Ser Asp

130 135 140

Ile Ile Tyr Thr Thr Asn Ser Asn Leu Gly Phe Asp Tyr Leu Asn Asp

145 150 155 160

Asn Leu Ala Ser Asn Glu Glu Gly Lys Phe Leu Arg Pro Phe Asn Tyr

165 170 175

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Val Ile Ile Asp Glu Il Asp Asp Ile Leu Leu Asp Ser Ala Gln Thr
 180 185 190

Pro Leu Ile Ile Ala Gly Ser Pro Arg Val Gln Ser Asn Tyr Tyr Ala
 195 200 205

Ile Ile Asp Thr Leu Val Thr Thr Leu Val Glu Gly Glu Asp Tyr Ile
 210 215 220

Phe Lys Glu Glu Lys Glu Glu Val Trp Leu Thr Thr Lys Gly Ala Lys
 225 230 235 240

Ser Ala Glu Asn Phe Leu Gly Ile Asp Asn Leu Tyr Lys Glu Glu His
 245 250 255

Ala Ser Phe Ala Arg His Leu Val Tyr Ala Ile Arg Ala His Lys Leu
 260 265 270

Phe Thr Lys Asp Lys Asp Tyr Ile Ile Arg Gly Asn Glu Met Val Leu
 275 280 285

Val Asp Lys Gly Thr Gly Arg Leu Met Glu Met Thr Lys Leu Gln Gly
 290 295 300

Gly Leu His Gln Ala Ile Glu Ala Lys Glu His Val Lys Leu Ser Pro
 305 310 315 320

Glu Thr Arg Ala Met Ala Ser Ile Thr Tyr Gln Ser Leu Phe Lys Met
 325 330 335

Phe Asn Lys Ile Ser Gly Met Thr Gly Thr Gly Lys Val Ala Glu Lys
 340 345 350

Glu Phe Ile Glu Thr Tyr Asn Met Ser Val Val Arg Ile Pro Thr Asn
 355 360 365

Arg Pro Arg Gln Arg Ile Asp Tyr Pro Asp Asn Leu Tyr Ile Thr Leu
 370 375 380

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 109270 60269600

150

Pro Glu Lys Val Tyr Ala Ser Leu Glu Tyr Ile Lys Gln Tyr His Ala
385 390 395 400

Lys Gly Asn Pro Leu Leu Val Phe Val Gly Ser Val Glu Met Ser Gln
405 410 415

Leu Tyr Ser Ser Leu Leu Phe Arg Glu Gly Ile Ala His Asn Val Leu
420 425 430

Asn Ala Asn Asn Ala Ala Arg Glu Ala Gln Ile Ile Ser Glu Ser Gly
435 440 445

Gln Met Gly Ala Val Thr Val Ala Thr Ser Met Ala Gly Arg Gly Thr
450 455 460

Asp Ile Lys Leu Gly Lys Gly Val Ala Glu Leu Gly Gly Leu Ile Val
465 470 475 480

Ile Gly Thr Glu Arg Met Glu Ser Gln Arg Ile Asp Leu Gln Ile Arg
485 490 495

Gly Arg Ser Gly Arg Gln Gly Asp Pro Gly Met Ser Lys Phe Phe Val
500 505 510

Ser Leu Glu Asp Asp Val Ile Lys Lys Phe Gly Pro Ser Trp Val His
515 520 525

Lys Lys Tyr Lys Asp Tyr Gln Val Gln Asp Met Thr Gln Pro Glu Val
530 535 540

Leu Lys Gly Arg Lys Tyr Arg Lys Leu Val Glu Lys Ala Gln His Ala
545 550 555 560

Ser Asp Ser Ala Gly Arg Ser Ala Arg Arg Gln Thr Leu Glu Tyr Ala
565 570 575

Glu Ser Met Asn Ile Gln Arg Asp Ile Val Tyr Lys Glu Arg Asn Arg
580 585 590

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Leu Ile Asp Gly Ser Arg Asp Leu Glu Asp Val Val Val Asp Ile Ile
 595 600 605

Glu Arg Tyr Thr Glu Glu Val Ala Ala Asp His Tyr Ala Ser Arg Glu
 610 615 620

Leu Leu Phe His Phe Ile Val Thr Asn Ile Ser Phe His Val Lys Glu
 625 630 635 640

Val Pro Asp Tyr Ile Asp Val Thr Asp Lys Thr Ala Val Arg Ser Phe
 645 650 655

Met Lys Gln Val Ile Asp Lys Glu Leu Ser Glu Lys Lys Glu Leu Leu
 660 665 670

Asn Gln His Asp Leu Tyr Glu Gln Phe Leu Arg Leu Ser Leu Leu Lys
 675 680 685

Ala Ile Asp Asp Asn Trp Val Glu Gln Val Asp Tyr Leu Gln Gln Leu
 690 695 700

Ser Met Ala Ile Gly Gly Gln Ser Ala Ser Gln Lys Asn Pro Ile Val
 705 710 715 720

Glu Tyr Tyr Gln Glu Ala Tyr Ala Gly Phe Glu Ala Met Lys Glu Gln
 725 730 735

Ile His Ala Asp Met Val Arg Asn Leu Leu Met Gly Leu Val Glu Val
 740 745 750

Thr Pro Lys Gly Glu Ile Val Thr His Phe Pro
 755 760

00760707-042604

<213> Streptococcus pneumoniae

Met Ile Gly Thr Phe Ala Ala Ala Leu Val Ala Val Leu Ala Asn Phe
1 5 10 15

Ile Val Pro Ile Glu Ile Thr Pro Asn Ser Ala Asn Thr Glu Ile Ala
20 25 30

Pro Pro Asp Gly Ile Gly Gln Val Leu Ser Asn Leu Leu Leu Lys Leu
35 40 45

Val Asp Asn Pro Val Asn Ala Leu Leu Thr Ala Asn Tyr Ile Arg Ile
50 55 60

Leu Ser Trp Ala Val Ile Phe Gly Ile Ala Met Arg Glu Ala Ser Lys
65 70 75 80

Asn Ser Gln Glu Leu Leu Lys Thr Ile Ala Asp Val Thr Ser Lys Ile
85 90 95

Val Glu Trp Ile Ile Asn Leu Ala Pro Phe Gly Ile Leu Gly Leu Val
100 105 110

Phe Lys Thr Ile Ser Asp Lys Gly Val Gly Ser Leu Ala Asn Tyr Gly
115 120 125

Ile Leu Leu Val Leu Leu Val Thr Thr Met Leu Phe Val Ala Pro Val
130 135 140

Val Asn Pro Leu Ile Ala Phe Phe Phe Met Arg Arg Asn Pro Tyr Pro
145 150 155 160

Leu Val Trp Asn Cys Leu Arg Val Ser Gly Val Thr Ala Phe Phe Thr
165 170 175

Figure 6. The effect of the number of iterations (n) on the accuracy of the proposed algorithm. The error rate decreases as the number of iterations increases. The error rate is approximately 0.01 after 100 iterations.

15

154

Ala Cys Leu Leu Ala Tyr Phe Leu Asn Leu Ser Ser Ala Val Ser Ala
20 25 30

Gly Ile Ile Ala Leu Leu Ser Leu Ser Asp Thr Arg Arg Ser Thr Leu
35 40 45

Lys Leu Ala Arg Asn Arg Leu Phe Ser Met Leu Leu Ala Leu Ala Ile
50 55 60

Gly Val Leu Ala Phe His Leu Ser Gly Phe His Ile Trp Ser Leu Gly
65 70 75 80

Leu Tyr Leu Ala Phe Tyr Val Pro Leu Ala Tyr Lys Met Gly Trp Glu
85 90 95

Ile Gly Ile Thr Pro Ser Thr Val Leu Val Ser His Leu Leu Val Gln
100 105 110

Glu Ser Thr Ser Pro Asp Leu Leu Val Asn Glu Phe Leu Leu Phe Ala
115 120 125

Ile Gly Thr Gly Phe Ala Leu Leu Val Asn Leu Tyr Met Pro Ser Arg
130 135 140

Glu Glu Glu Ile Gln His Tyr His Thr Leu Val Glu Glu Lys Leu Lys
145 150 155 160

Asp Ile Leu Gln Arg Phe Lys Tyr Tyr Leu Ser Arg Gly Asp Gly Arg
165 170 175

Asn Arg Ala Gln Leu Val Ala Glu Leu Asp Thr Leu Leu Lys Glu Ala
180 185 190

L u Arg Leu Val Tyr Leu Asp His Ser Asp His Leu Phe His Gln Thr
195 200 205

Asp Tyr His Ile His Tyr Phe Glu Met Arg Gln Arg Gln Ser Arg Ile
210 215 220

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155

Leu Arg Asn M t Ala Gln Gln Ile Asn Thr Cys His Leu Ala Ala Ser
225 230 235 240

Glu Ser Leu Ile Leu Ala Gln Leu Phe Ser Lys Ile Ala Gly Gln Leu
245 250 255

Ser Gln Thr Asn Pro Ala Ser Asp Leu Leu Asp Glu Ile Glu Arg Tyr
260 265 270

Leu Glu Val Phe Arg Asn Arg Ser Leu Pro Lys Thr Arg Glu Glu Phe
275 280 285

Glu Thr Arg Ala Thr Leu Leu Gln Leu Leu Arg Glu Ala Lys Thr Phe
290 295 300

Ile Gln Val Lys Val Asp Phe Tyr Gln Lys Tyr Arg Gln
305 310 315

<210> 66

<211> 537

<212> PRT

<213> Streptococcus pneumoniae

<400> 66

Met Glu Ile Met Ser Leu Ala Ile Ala Val Phe Ala Val Ile Ile Gly
1 5 10 15

Leu Val Ile Gly Tyr Val Ser Ile Ser Ala Lys Met Lys Ser Ser Gln
20 25 30

Glu Ala Ala Glu Leu Met Leu Leu Asn Ala Glu Gln Glu Ala Thr Asn
35 40 45

Leu Arg Gly Gln Ala Glu Arg Glu Ala Asp Leu Leu Val Asn Glu Ala
50 55 60

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[illegible]

Thr Gly Val Asp Val Ile Ile Asp Asp Thr Pro Glu Val Val Thr Leu
260 265 270

Ser Gly Phe Asp Pro Ile Arg Arg Glu Ile Ala Arg Met Thr Met Glu
275 280 285

Met Leu Leu Lys Asp Gly Arg Ile His Pro Ala Arg Ile Glu Glu Leu
290 295 300

Val Glu Lys Asn Arg Gln Glu Ile Asp Asn Lys Ile Arg Glu Tyr Gly
305 310 315 320

Glu Ala Ala Ala Tyr Glu Ile Gly Ala Pro Asn Leu His Pro Asp Leu
325 330 335

Met Lys Ile Met Gly Arg Leu Gln Phe Arg Thr Ser Tyr Gly Gln Asn
340 345 350

Val Leu Arg His Ser Ile Glu Val Ala Lys Leu Ala Gly Ile Met Ala
355 360 365

Ser Glu Leu Gly Glu Asn Ala Ala Leu Ala Arg Arg Ala Gly Phe Leu
370 375 380

His Asp Ile Gly Lys Ala Ile Asp His Glu Val Glu Gly Ser His Val
385 390 395 400

Glu Ile Gly Met Glu Leu Ala Arg Lys Tyr Lys Glu Pro Pro Val Val
405 410 415

Val Asn Thr Ile Ala Ser His His Gly Asp Val Glu Ala Glu Ser Val
420 425 430

Ile Ala Val Ile Val Ala Ala Ala Asp Ala Leu Ser Ala Ala Arg Pro
435 440 445

Gly Ala Arg Ser Glu Ser Leu Glu Ser Tyr Ile Lys Arg Leu His Asp
450 455 460

Leu Glu Glu Ile Ala Asn Gly Phe Glu Gly Val Gln Thr Ser Phe Ala
465 470 475 480

00760707 043604

Arg Arg Lys Glu Glu Glu Glu Lys Lys Ile Lys Glu Gln Ile Ala Lys
85 90 95

100

<213> Streptococcus pneumoniae

Met Ser Ala Tyr Gln Leu Pro Thr Val Trp Gln Asp Glu Ala Ser Asn
1 5 10 15

Gln Gly Ala Phe Thr Gly Leu Asn Arg Pro Thr Ala Gly Ala Arg Phe
20 25 30

Glu Gln Asn Leu Pro Lys Gly Glu Gln Ala Phe Gln Leu Tyr Ser Leu
35 40 45

Gly Thr Pro Asn Gly Val Lys Val Thr Ile Leu Leu Glu Glu Leu Leu
50 55 60

Glu Ala Gly Phe Lys Glu Ala Ala Tyr Asp Leu Tyr Lys Ile Ala Ile
65 70 75 80

Met Asp Gly Asp Gln Phe Gly Ser Asp Phe Val Lys Leu Asn Pro Asn
85 90 95

Ser Lys Ile Pro Ala Leu Leu Asp Gln Ser Gly Thr Glu Asn Val Arg
100 105 110

Val Phe Glu Ser Ala His Ile Leu Leu Tyr Leu Ala Glu Lys Phe Gly
115 120 125

Ala Phe Leu Pro Ser Asn Pro Val Glu Lys Val Glu Val Leu Asn Trp
130 135 140

160

Leu Phe Trp Gln Ala Gly Ala Ala Pro Phe Leu Gly Gly Gly Phe Gly
145 150 155 160

His Phe Phe Asn Tyr Ala Pro Glu Lys Leu Glu Tyr Pro Ile Asn Arg
165 170 175

Phe Thr Met Glu Val Lys Arg Gln Leu Asp Leu Leu Asp Lys Glu Leu
180 185 190

Ala Gln Lys Pro Tyr Ile Ala Gly Asn Asp Tyr Thr Ile Ala Asp Ile
195 200 205

Ala Ile Trp Ser Trp Tyr Gly Gln Leu Val Gln Gly Asn Leu Tyr Gln
210 215 220

Gly Ser Ala Lys Phe Leu Asp Ala Ser Ser Tyr Gln Asn Leu Val Lys
225 230 235 240

Trp Ala Glu Lys Ile Ala Asn Arg Pro Ala Val Lys Arg Gly Leu Glu
245 250 255

Val Thr Tyr Thr Glu Ile Lys
260

<210> 69

<211> 312

<212> PRT

<213> Streptococcus pneumoniae

<400> 69

Leu Ala Ser Leu Ile Thr Ser Ile Ile Met Phe Tyr Val Gly Phe Asp
1 5 10 15

Val Leu Arg Asp Thr Ile Gln Lys Ile Leu Ser Arg Glu Glu Thr Val
20 25 30

161

Ile Asp Pro Leu Gly Ala Thr Leu Gly Ile Ile Ser Ala Ala Ile Met
35 40 45

Phe Val Val Tyr Leu Tyr Asn Thr Arg Leu Ser Lys Lys Ser Asn Ser
50 55 60

Asn Ala Leu Lys Ala Ala Ala Lys Asp Asn Leu Ser Asp Ala Val Thr
65 70 75 80

Ser Leu Gly Thr Ala Ile Ala Ile Leu Ala Ser Ser Phe Asn Tyr Pro
85 90 95

Ile Val Asp Lys Leu Val Ala Ile Ile Ile Thr Phe Phe Ile Leu Lys
100 105 110

Thr Ala Tyr Asp Ile Phe Ile Glu Ser Ser Phe Ser Leu Ser Asp Gly
115 120 125

Phe Asp Asp Arg Leu Leu Glu Asp Tyr Gln Lys Ala Ile Met Glu Ile
130 135 140

Pro Lys Ile Ser Lys Val Lys Ser Gln Arg Gly Arg Thr Tyr Gly Ser
145 150 155 160

Asn Ile Tyr Leu Asp Ile Thr Leu Glu Met Asn Pro Asp Leu Ser Val
165 170 175

Phe Glu Ser His Glu Ile Ala Asp Gln Val Glu Ser Met Leu Glu Glu
180 185 190

Arg Phe Gly Val Phe Asp Thr Asp Val His Ile Glu Pro Ala Pro Ile
195 200 205

Pro Glu Asp Glu Ile Leu Asp Asn Val Tyr Lys Lys Leu Leu Met Arg
210 215 220

Glu Gln Leu Ile Asp Gln Gly Asn Gln Leu Glu Glu Leu Leu Thr Asp
225 230 235 240

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162

Asp Phe Val Tyr Ile Arg Gln Asp Gly Glu Gln Met Asp Lys Glu Ala .
245 250 255

Tyr Lys Thr Lys Lys Glu Leu Asn Ser Ala Ile Lys Asp Ile Gln Ile
260 265 270

Thr Ser Ile Ser Gln Lys Thr Lys Leu Ile Cys Tyr Glu Leu Asp Gly
275 280 285

Ile Ile His Thr Ser Ile Trp Arg Arg His Glu Thr Trp Gln Asn Ile
290 295 300

Phe His Gln Glu Thr Lys Lys Glu
305 310

<210> 70

<211> 264

<212> PRT

<213> Streptococcus pneumoniae

<400> 70

Met Thr Ile Lys Leu Val Ala Thr Asp Met Asp Gly Thr Phe Leu Asp
1 5 10 15

Gly Asn Gly Arg Phe Asp Met Asp Arg Leu Lys Ser Leu Leu Val Ser
20 25 30

Tyr Lys Glu Lys Gly Ile Tyr Phe Ala Val Ala Ser Gly Arg Gly Phe
35 40 45

Leu Ser Leu Glu Lys Leu Phe Ala Gly Val Arg Asp Asp Ile Ile Phe
50 55 60

Ile Ala Glu Asn Gly Ser Leu Val Glu Tyr Gln Gly Gln Asp Leu Tyr
65 70 75 80

00769707 04504

163

Glu Ala Thr Met Ser Arg Asp Phe Tyr Leu Ala Thr Phe Glu Lys Leu
85 90 95

Lys Thr Ser Pro Tyr Val Asp Ile Asn Lys Leu Leu Leu Thr Gly Lys
100 105 110

Lys Gly Ser Tyr Val Leu Asp Thr Val Asp Glu Thr Tyr Leu Lys Val
115 120 125

Ser Gln His Tyr Asn Glu Asn Ile Gln Lys Val Ala Ser Leu Glu Asp
130 135 140

Ile Thr Asp Asp Ile Phe Lys Phe Thr Thr Asn Phe Thr Glu Glu Thr
145 150 155 160

Leu Glu Asp Gly Glu Ala Trp Val Asn Glu Asn Val Pro Gly Val Lys
165 170 175

Ala Met Thr Thr Gly Phe Glu Ser Ile Asp Ile Val Leu Asp Tyr Val
180 185 190

Asp Lys Gly Val Ala Ile Val Glu Leu Val Lys Lys Leu Gly Ile Thr
195 200 205

Met Asp Gln Val Met Ala Phe Gly Asp Asn Leu Asn Asp Leu His Met
210 215 220

Met Gln Val Val Gly His Pro Val Ala Pro Glu Asn Ala Arg Pro Glu
225 230 235 240

Ile Leu Glu Leu Ala Lys Thr Val Ile Gly His His Lys Glu Arg Ser
245 250 255

Val Ile Ala Tyr Met Glu Gly Leu
260

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T0907014604

<210> 71

<211> 272

<212> PRT

<213> Streptococcus pneumoniae

<400> 71

Met Ala Asp Ile Lys Leu Ile Ala Leu Asp Leu Asp Gly Thr Leu Leu

1

5

10

15

Thr Thr Asp Lys Arg Leu Thr Asp Arg Thr Lys Glu Thr Leu Gln Ala

20

25

30

Ala Arg Asp Arg Gly Ile Lys Val Val Leu Thr Thr Gly Arg Pro Leu

35

40

45

Lys Ala Met Asp Phe Phe Leu His Glu Leu Gly Thr Asp Gly Gln Glu

50

55

60

Asp Glu Tyr Thr Ile Thr Phe Asn Gly Gly Leu Val Gln Lys Asn Thr

65

70

75

80

Gly Glu Ile Leu Asp Lys Thr Val Phe Ser Tyr Asp Asp Val Ala Arg

85

90

95

Leu Tyr Glu Glu Thr Glu Lys Leu Ser Leu Pro Leu Asp Ala Ile Ser

100

105

110

Glu Gly Thr Val Tyr Gln Ile Gln Ser Asp Gln Glu Ser Leu Tyr Ala

115

120

125

Lys Phe Asn Pro Ala Leu Thr Phe Val Pro Val Asp Phe Glu Asp Leu

130

135

140

Ser Ser Gln Met Thr Tyr Asn Lys Cys Val Thr Ala Phe Ala Gln Glu

145

150

155

160

Pro Leu Asp Ala Ala Ile Gln Lys Ile Ser Pro Glu Leu Phe Asp Gln

165

170

175

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Leu Glu Glu Ala Tyr Glu Thr Gly Asp Lys Asp Glu Ile Glu Arg Cys
245 250 255

Arg Lys Ser Leu Leu Ala Ser Val Lys Arg Phe Ala Arg Asp Ile Arg
 260 265 270

Asn Lys Tyr Ile Ala Pro Pro Arg Thr Thr Asn Phe Gly Val Leu Phe
 275 280 285

Val Pro Thr Glu Gly Leu Tyr Ser Glu Ile Val Arg Asn Pro Val Phe
 290 295 300

Phe Asp Asp Leu Arg Arg Glu Glu Gln Ile Ile Val Ala Gly Pro Ser
 305 310 315 320

Thr Leu Ser Ala Leu Leu Asn Ser Leu Ser Val Gly Phe Lys Thr Leu
 325 330 335

Asn Ile Gln Lys Ser Ala Asp His Ile Ser Lys Thr Leu Ala Ser Val
 340 345 350

Lys Thr Glu Phe Gly Lys Phe Gly Gly Ile Leu Val Lys Ala Gln Lys
 355 360 365

His Leu Gln His Ala Ser Gly Asn Ile Asp Glu Leu Leu Asn Arg Arg
 370 375 380

Thr Ile Ala Ile Glu Arg Thr Leu Arg His Ile Glu Leu Ser Glu Gly
 385 390 395 400

Glu Pro Ala Leu Asp Leu Leu His Phe Gln Glu Asn Glu Glu Glu Tyr
 405 410 415

Glu Asp

009070-0450
 109070-0450

<210> 73

<211> 313

<212> PRT

<213> Streptococcus pneumoniae

<400> 73

Met Lys Ile Ser His Met Lys Lys Asp Glu Leu Phe Glu Gly Phe Tyr
 1 5 10 15

Leu Ile Lys Ser Ala Asp Leu Arg Gln Thr Arg Ala Gly Lys Asn Tyr
 20 25 30

Leu Ala Phe Thr Phe Gln Asp Asp Ser Gly Glu Ile Asp Gly Lys Leu
 35 40 45

Trp Asp Ala Gln Pro His Asn Ile Glu Ala Phe Thr Ala Gly Lys Val
 50 55 60

Val His Met Lys Gly Arg Arg Glu Val Tyr Asn Asn Thr Pro Gln Val
 65 70 75 80

Asn Gln Ile Thr Leu Arg Leu Pro Gln Ala Gly Glu Pro Asn Asp Pro
 85 90 95

Ala Asp Phe Lys Val Lys Ser Pro Val Asp Val Lys Glu Ile Arg Asp
 100 105 110

Tyr Met Ser Gln Met Ile Phe Lys Ile Glu Asn Pro Val Trp Gln Arg
 115 120 125

Ile Val Arg Asn Leu Tyr Thr Lys Tyr Asp Lys Glu Phe Tyr Ser Tyr
 130 135 140

Pro Ala Ala Lys Thr Asn His His Ala Phe Glu Thr Gly Leu Ala Tyr
 145 150 155 160

His Thr Ala Thr Met Val Arg Leu Ala Asp Ala Ile Ser Glu Val Tyr
 165 170 175

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 109370 1029100

[illegible]

Thr Leu Thr Ala Leu Ser Thr Trp Phe Val Tyr Arg Tyr Ala Asp Lys
210 215 220

171

Ile Gln Lys Asp Pro Thr Lys Ser Leu Val Tyr Ser Thr Arg Lys Glu
225 230 235 240

Asp Leu Lys His Phe Asn Val Glu Glu Ser Ser Ser Val Glu Ser Thr
245 250 255

Leu Ser Ser Lys Gln Lys Ser Val Leu Phe Leu Phe Val Leu Thr Phe
260 265 270

Ile Leu Met Val Leu Ser Phe Ile Pro Trp Thr Asp Leu Gly Val Thr
275 280 285

Ile Phe Asp Asp Phe Asn Thr Trp Leu Thr Gly Leu Pro Val Ile Gly
290 295 300

Asn Ile Val Gly Ser Ser Thr Ser Ala Leu Gly Thr Trp Tyr Phe Pro
305 310 315 320

Glu Gly Ala Met Leu Phe Ala Phe Met Gly Ile Leu Ile Gly Val Ile
325 330 335

Tyr Gly Leu Lys Glu Asp Lys Ile Ile Ser Ser Phe Met Asn Gly Ala
340 345 350

Ala Asp Leu Leu Ser Val Ala Leu Ile Val Ala Ile Ala Arg Gly Ile
355 360 365

Gln Val Ile Met Asn Asp Gly Met Ile Thr Asp Thr Ile Leu Asn Trp
370 375 380

Gly Lys Glu Gly Leu Ser Gly Leu Ser Ser Gln Val Phe Ile Val Val
385 390 395 400

Thr Tyr Ile Phe Tyr Leu Pro Met Ser Phe Leu Ile Pro Ser Ser Ser
405 410 415

Gly Leu Ala Ser Ala Thr Met Gly Ile Met Ala Pro Leu Gly Glu Phe
420 425 430

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Val Asn Val Arg Pro S r Leu Ile Ile Thr Ala Tyr Gln Ser Ala Ser
 435 440 445

Gly Val Leu Asn Leu Ile Ala Pro Thr Ser Gly Ile Val Met Gly Ala
 450 455 460

Leu Ala Leu Gly Arg Ile Asn Ile Gly Thr Trp Trp Lys Phe Met Gly
 465 470 475 480

Lys Leu Val Val Ala Ile Ile Val Val Thr Ile Ala Leu Leu Leu Leu
 485 490 495

Gly Thr Phe Leu Pro Phe Leu
 500

<210> 75

<211> 782

<212> PRT

<213> Streptococcus pneumoniae

<400> 75

Met Ser Asn Ser Phe Val Lys Leu Leu Val Ser Gln Leu Phe Ala Asn
 1 5 10 15

Leu Ala Asp Ile Phe Phe Arg Val Thr Ile Ile Ala Asn Ile Tyr Ile
 20 25 30

Ile Ser Lys Ser Val Ile Ala Thr Ser Leu Val Pro Ile Leu Ile Gly
 35 40 45

Ile Ser Ser Phe Val Ala Ser Leu Leu Val Pro Leu Val Thr Lys Arg
 50 55 60

Leu Ala Leu Asn Arg Val Leu Ser Leu Ser Gln Phe Gly Lys Thr Ile
 65 70 75 80

0096970 04360

[illegible]

Phe Leu Ala Ala Lys Trp Glu Pro Gln Leu Phe Thr Pro Asn Leu Lys
275 280 285

Thr Ile Gln Asn Pro Cys Leu Ser Leu Asp Pro Gly Trp Phe Leu Phe
290 295 300

Ser Pro Asn Gly Cys Phe Leu Leu Asp Lys Lys Glu Phe Pro Leu Tyr
305 310 315 320

Gly Ile Ser Val Glu Lys Asn Thr Lys Arg Lys Glu Thr His Met Asn
325 330 335

Ser Leu Pro Asn His His Phe Gln Asn Lys Ser Phe Tyr Gln Leu Ser
340 345 350

Phe Asp Gly Gly His Leu Thr Gln Tyr Gly Gly Leu Ile Phe Phe Gln
355 360 365

Glu Leu Phe Ser Gln Leu Lys Leu Lys Glu Arg Ile Ser Lys Tyr Leu
370 375 380

Val Thr Asn Asp Gln Arg Arg Tyr Cys Arg Tyr Ser Asp Ser Asp Ile
385 390 395 400

Leu Val Gln Phe Leu Phe Gln Leu Leu Thr Gly Tyr Gly Thr Asp Tyr
405 410 415

Ala Cys Lys Glu Leu Ser Ala Asp Ala Tyr Phe Pro Lys Leu Leu Glu
420 425 430

Gly Gly Gln Leu Ala Ser Gln Pro Thr Leu Ser Arg Phe Leu Ser Arg
435 440 445

Thr Asp Glu Glu Thr Val His Ser Leu Arg Cys Leu Asn Leu Glu Leu
450 455 460

Val Glu Phe Phe Leu Gln Phe His Gln Leu Asn Gln Leu Ile Val Asp
465 470 475 480

Ile Asp Ser Thr His Phe Thr Thr Tyr Gly Lys Gln Glu Gly Val Ala
485 490 495

00760707 01501

Tyr Asn Ala His Tyr Arg Ala His Gly Tyr His Pro Leu Tyr Ala Phe
500 505 510

Glu Gly Lys Thr Gly Tyr Cys Phe Asn Ala Gln Leu Arg Pro Gly Asn
515 520 525

Arg Tyr Cys Ser Glu Glu Ala Asp Ser Phe Ile Thr Pro Val Leu Glu
530 535 540

Arg Phe Asn Gln Leu Leu Phe Arg Met Asp Ser Gly Phe Ala Thr Pro
545 550 555 560

Lys Leu Tyr Asp Leu Ile Glu Lys Thr Gly Gln Tyr Tyr Leu Ile Lys
565 570 575

Leu Lys Lys Asn Thr Val Leu Ser Arg Leu Gly Asp Leu Ser Leu Pro
580 585 590

Cys Pro Gln Asp Glu Asp Leu Thr Ile Leu Pro His Ser Ala Tyr Ser
595 600 605

Glu Thr Leu Tyr Gln Ala Gly Ser Trp Ser His Lys Arg Arg Val Cys
610 615 620

Gln Phe Ser Glu Arg Lys Glu Gly Asn Leu Phe Tyr Asp Val Ile Ser
625 630 635 640

Leu Val Thr Asn Met Thr Ser Gly Thr Ser Gln Asp Gln Phe Gln Leu
645 650 655

Tyr Arg Gly Arg Gly Gln Ala Glu Asn Phe Ile Lys Glu Met Lys Glu
660 665 670

Gly Phe Phe Gly Asp Lys Thr Asp Ser Ser Thr Leu Ile Lys Asn Glu
675 680 685

Val Arg Met Met Met Ser Cys Ile Ala Tyr Asn Leu Tyr Leu Phe Leu
690 695 700

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176

Lys His Leu Ala Gly Gly Asp Phe Gln Thr Leu Thr Ile Lys Arg Phe
705 710 715 720

Arg His Leu Phe Leu His Val Val Gly Lys Cys Val Arg Thr Gly Arg
725 730 735

Lys Gln Leu Leu Lys Leu Ser Ser Leu Tyr Ala Tyr Ser Glu Leu Phe
740 745 750

Ser Ala Leu Tyr Ser Arg Ile Arg Lys Val Asn Leu Asn Leu Pro Val
755 760 765

Pro Tyr Glu Pro Pro Arg Arg Lys Ala Ser Leu Met Met His
770 775 780

<210> 76

<211> 414

<212> PRT

<213> Streptococcus pneumoniae

<400> 76

Met Met Glu Phe Phe Gln Gln Leu Pro His Leu Glu Pro Tyr Gly Asn
1 5 10 15

Pro Gln Tyr Phe Val Tyr Val Ile Ala Ala Thr Leu Pro Ile Phe Ile
20 25 30

Gly Leu Phe Phe Lys Lys Arg Phe Ala Trp Tyr Glu Val Leu Val Ser
35 40 45

Leu Phe Phe Ile Val Thr Met Leu Val Gly Gly Lys Thr Asn Gln Leu
50 55 60

Ala Ala Leu Gly Ile Tyr Leu Cys Trp Glu Ile Leu Leu Leu Phe
65 70 75 80

00760707 013004

177

Tyr Lys His Tyr Arg Lys Ser Lys Asp Gly Lys Trp Val Phe Tyr Leu
85 90 95

Val Ser Phe Leu Ser Leu Leu Pro Ile Ile Phe Val Lys Val Gln Pro
100 105 110

Ala Ile Asn Gly Thr Gln Ser Leu Leu Gly Phe Leu Gly Ile Ser Tyr
115 120 125

Leu Thr Phe Arg Ser Val Gly Ile Val Ile Glu Leu Arg Asp Gly Val
130 135 140

Ile Lys Asp Phe Thr Leu Trp Glu Phe Leu Arg Phe Leu Leu Phe Met
145 150 155 160

Pro Thr Phe Ser Ser Gly Pro Ile Asp Arg Phe Lys Arg Phe Asn Glu
165 170 175

Asn Tyr Gln Ala Ile Pro Glu Arg Asp Glu Leu Met Asp Met Leu Asp
180 185 190

Glu Ser Val Arg Tyr Ile Met Trp Gly Phe Leu Tyr Lys Phe Ile Leu
195 200 205

Ala His Val Leu Gly Glu Thr Leu Leu Pro Pro Leu Lys Asn Leu Ala
210 215 220

Leu Gln Ser Gly Gly Phe Phe Asn Leu Tyr Ala Leu Ala Val Met Tyr
225 230 235 240

Thr Phe Gly Leu Glu Leu Phe Phe Asp Phe Ala Gly Tyr Ser Met Phe
245 250 255

Ala L u Ala Ile Ser Asn Leu Met Gly Ile Arg Ser Pro Ile Asn Phe
260 265 270

Asn Lys Pro Phe Leu Ser Arg Asp Leu Lys Glu Phe Trp Asn Arg Trp
275 280 285

0066709 043604

His Met Ser Leu Ser Phe Trp Phe Arg Asp Phe Val Phe Met Arg Met
 290 295 300

Val Met Val Leu Thr Arg Lys Lys Val Phe Lys Asn Arg Asn Val Thr
 305 310 315 320

Ser Ser Met Ala Tyr Ile Val Asn Met Leu Ile Met Gly Phe Trp His
 325 330 335

Gly Val Thr Trp Tyr Tyr Ile Ala Tyr Gly Leu Phe His Gly Leu Gly
 340 345 350

Leu Val Ile Asn Asp Ala Trp Val Arg Lys Lys Lys Thr Leu Asn Lys
 355 360 365

Glu Arg Lys Lys Ala Gly Lys Ala Ala Leu Pro Glu Asn Arg Trp Ile
 370 375 380

Gln Leu Leu Gly Met Val Val Thr Phe His Val Val Met Leu Ser Phe
 385 390 395 400

Leu Ile Phe Ser Gly Phe Leu Asn Asn Leu Trp Phe Lys Lys
 405 410

<210> 77

<211> 422

<212> PRT

<213> Streptococcus pneumoniae

<400> 77

Met Leu Lys Arg Leu Trp Met Ile Phe Gly Pro Val Leu Ile Ala Gly
 1 5 10 15

Leu Leu Val Phe Leu Leu Ile Phe Phe Tyr Pro Thr Glu Met His His
 20 25 30

009697001000

Asn Leu Gly Ala Glu Lys Arg Ser Ala Val Ala Thr Thr Ile Asp Ser
 35 40 45

Phe Lys Glu Arg Ser Gln Lys Val Arg Ala Leu Ser Asp Pro Asn Val
 50 55 60

Arg Phe Val Pro Phe Phe Gly Ser Ser Glu Trp Leu Arg Phe Asp Gly
 65 70 75 80

Ala His Pro Ala Val Leu Ala Glu Lys Tyr Asn Arg Ser Tyr Arg Pro
 85 90 95

Tyr Leu Leu Gly Gln Gly Gly Ala Ala Ser Leu Asn Gln Tyr Phe Gly
 100 105 110

Met Gln Gln Met Leu Pro Gln Leu Glu Asn Lys Gln Val Val Tyr Val
 115 120 125

Ile Ser Pro Gln Trp Phe Ser Lys Asn Gly Tyr Asp Pro Ala Ala Phe
 130 135 140

Gln Gln Tyr Phe Asn Gly Asp Gln Leu Thr Ser Phe Leu Lys His Gln
 145 150 155 160

Ser Gly Asp Gln Ala Ser Gln Tyr Ala Ala Thr Arg Leu Leu Gln Gln
 165 170 175

Phe Pro Asn Val Ala Met Lys Asp Leu Val Gln Lys Leu Ala Ser Lys
 180 185 190

Glu Glu Leu Ser Thr Ala Asp Asn Glu Met Ile Glu Leu Leu Ala Arg
 195 200 205

Phe Asn Glu Arg Gln Ala Ser Phe Phe Gly Gln Phe Ser Val Arg Gly
 210 215 220

Tyr Val Asn Tyr Asp Lys His Val Ala Lys Tyr Leu Lys Ile Leu Pro
 225 230 235 240

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 1093270-20209200

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044

Asp Val Lys Glu Phe Gln
420

<210> 78

<211> 206

<212> PRT

<213> Streptococcus pneumoniae

<400> 78

Met Glu Lys Asn Leu Lys Ala Leu Lys Gln Thr Thr Asp Gln Glu Gly

1 5 10 15

Pro Ala Ile Glu Pro Glu Lys Ala Glu Asp Thr Lys Thr Val Gln Asn

20 25 30

Gly Tyr Phe Glu Asp Ala Ala Val Lys Asp Arg Thr Leu Ser Asp Tyr

35 40 45

Ala Gly Asn Trp Gln Ser Val Tyr Pro Phe Leu Glu Asp Gly Thr Phe

50 55 60

Asp Gln Val Phe Asp Tyr Lys Ala Lys Leu Thr Gly Lys Met Thr Gln

65 70 75 80

Ala Glu Tyr Lys Ala Tyr Tyr Thr Lys Gly Tyr His Thr Asp Val Thr

85 90 95

Lys Ile Asn Ile Thr Asp Asn Thr Met Glu Phe Val Gln Gly Gly Gln

100 105 110

Ser Lys Lys Tyr Thr Tyr Lys Tyr Val Gly Lys Lys Ile Leu Thr Tyr

115 120 125

Lys Lys Gly Asn Arg Gly Val Arg Phe Leu Phe Glu Ala Thr Asp Ala

130 135 140

Asp Ala Gly Gln Phe Lys Tyr Val Gln Phe Ser Asp His Asn Val Ala

145 150 155 160

Pro Val Lys Ala Glu His Phe His Ile Phe Phe Gly Gly Thr Ser Gln

165 170 175

00960307 04604

Leu Asp Thr Ile Phe Tyr Lys Gly Phe Ser Glu Glu Glu Ile His Gln
115 120 125

Ph Glu Gly Phe Gln Glu Arg Ile Leu Ala Asn Leu Lys Glu Lys Gly
 130 135 140

Asn Glu Val
 145

<210> 80

<211> 506

<212> PRT

<213> Streptococcus pneumoniae

<400> 80

Met Thr Asn Leu Ile Ala Thr Phe Gln Asp Arg Phe Ser Asp Trp Leu
 1 5 10 15

Thr Ala Leu Ser Gln His Leu Gln Leu Ser Leu Leu Thr Leu Leu
 20 25 30

Ala Ile Leu Leu Ala Ile Pro Leu Ala Val Phe Leu Arg Tyr His Glu
 35 40 45

Lys Leu Ala Asp Trp Val Leu Gln Ile Ala Gly Ile Phe Gln Thr Ile
 50 55 60

Pro Ser Leu Ala Leu Leu Gly Leu Phe Ile Pro Leu Met Gly Ile Gly
 65 70 75 80

Thr Leu Pro Ala Leu Thr Ala Leu Val Ile Tyr Ala Ile Phe Pro Ile
 85 90 95

Leu Gln Asn Thr Ile Thr Gly Leu Lys Gly Ile Asp Pro Asn Leu Gln
 100 105 110

Glu Ala Gly Ile Ala Phe Gly Met Thr Arg Trp Glu Arg Leu Lys Lys
 115 120 125

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 T09270 2029260

184

Phe Glu Ile Pro Leu Ala Met Pro Val Ile Met Ser Gly Ile Arg Thr
130 135 140

Ala Ala Val Leu Ile Ile Gly Thr Ala Thr Leu Ala Ala Leu Ile Gly
145 150 155 160

Ala Gly Gly Leu Gly Ser Phe Ile Leu Leu Gly Ile Asp Arg Asn Asn
165 170 175

Ala Ser Leu Ile Leu Ile Gly Ala Leu Ser Ser Ala Val Leu Ala Ile
180 185 190

Ala Phe Asn Phe Leu Leu Lys Val Met Glu Lys Ala Lys Leu Arg Thr
195 200 205

Ile Phe Ser Gly Phe Ala Leu Val Ala Leu Leu Leu Gly Leu Ser Tyr
210 215 220

Ser Pro Ala Leu Leu Val Gln Lys Glu Lys Glu Asn Leu Val Ile Ala
225 230 235 240

Gly Lys Ile Gly Pro Glu Pro Glu Ile Leu Ala Asn Met Tyr Lys Leu
245 250 255

Leu Ile Glu Glu Asn Thr Ser Met Thr Ala Thr Val Lys Pro Asn Phe
260 265 270

Gly Lys Thr Ser Phe Leu Tyr Glu Ala Leu Lys Lys Gly Asp Ile Asp
275 280 285

Ile Tyr Pro Glu Phe Thr Gly Thr Val Thr Glu Ser Leu Leu Gln Pro
290 295 300

Ser Pro Lys Val Ser His Glu Pro Glu Gln Val Tyr Gln Val Ala Arg
305 310 315 320

Asp Gly Ile Ala Lys Gln Asp His Leu Ala Tyr Leu Lys Pro Met Ser
325 330 335

00760701 013601

Phe Leu Gln Glu Gln Gly Leu Leu Lys Lys
500 505

<210> 81

<211> 269

<212> PRT

<213> Streptococcus pneumoniae

<400> 81

Met Met His Thr Tyr Leu Gln Lys Lys Ile Glu Asn Ile Lys Thr Thr

1

5

10

15

Leu Gly Glu Met Ser Gly Gly Tyr Arg Arg Met Val Ala Ala Met Ala

20

25

30

Asp Leu Gly Phe Ser Gly Thr Met Lys Ala Ile Trp Asp Asp Leu Phe

35

40

45

Ala His Arg Ser Phe Ala Gln Trp Ile Tyr Leu Leu Val Leu Gly Ser

50

55

60

Phe Pro Leu Trp Leu Glu Leu Val Tyr Glu His Arg Ile Val Asp Trp

65

70

75

80

Ile Gly Met Ile Cys Ser Leu Thr Gly Ile Ile Cys Val Ile Phe Val

85

90

95

Ser Glu Gly Arg Ala Ser Asn Tyr Leu Phe Gly Leu Ile Asn Ser Val

100

105

110

Ile Tyr Leu Ile Leu Ala Leu Gln Lys Gly Phe Tyr Gly Glu Val Leu

115

120

125

Thr Thr Leu Tyr Phe Thr Val Met Gln Pro Ile Gly Leu Leu Val Trp

130

135

140

Ile Tyr Gln Ala Gln Phe Lys Lys Glu Lys Gln Glu Phe Val Ala Arg

145

150

155

160

Lys Leu Asp Gly Lys Gly Trp Thr Lys Tyr Leu Ser Ile Ser Val Leu

165

170

175

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187

Trp Trp Leu Ala Phe Gly Phe Ile Tyr Gln Ser Ile Gly Ala Asn Arg
180 185 190

Pro Tyr Arg Asp Ser Ile Thr Asp Ala Thr Asn Gly Val Gly Gln Ile
195 200 205

Leu Met Thr Ala Val Tyr Arg Glu Gln Trp Ile Phe Trp Ala Ala Thr
210 215 220

Asn Val Phe Ser Ile Tyr Leu Trp Trp Gly Glu Ser Leu Gln Ile Gln
225 230 235 240

Gly Lys Tyr Leu Ile Tyr Leu Ile Asn Ser Leu Val Gly Trp Tyr Gln
245 250 255

Trp Ser Lys Ala Ala Lys Gln Asn Thr Asp Leu Leu Asn
260 265

<210> 82

<211> 299

<212> PRT

<213> Streptococcus pneumoniae

<400> 82

Met Arg Asn Met Lys Ala Lys Tyr Ala Val Trp Val Ala Phe Phe Leu
1 5 10 15

Asn Leu Thr Tyr Ala Ile Val Glu Phe Ile Ala Gly Gly Val Phe Gly
20 25 30

Ser Ser Ala Val Leu Ala Asp Ser Val His Asp Leu Gly Asp Ala Ile
35 40 45

Ala Ile Gly Ile Ser Ala Phe Leu Glu Thr Ile Ser Asn Arg Glu Glu
50 55 60

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[illegible]

Ser Ile Arg Ile Phe Leu Lys Asp Cys Gly Phe Gln Asn Ile Thr Ile
260 265 270

Gly His Arg Leu Pro Ser Glu Leu Ser Gly Gly Glu Gln Gln Arg Val
130 135 140

192

Phe Leu Ala Glu Leu Glu Gly Ile Gln Tyr Tyr Leu Asn Arg Gly Lys
260 265 270

His His Leu Pro Tyr Val Leu Asn Ile Gly Phe Pro Gly Gln Lys Asn
275 280 285

Asp Leu Leu Leu Leu Arg Leu Asp Leu Ala Gly Ile Ser Ile Ser Thr
290 295 300

Gly Ser Ala Cys Thr Ala Gly Val Val Gln Ser Ser His Val Leu Glu
305 310 315 320

Ala Met Tyr Gly Ala Asn Ser Glu Arg Leu Lys Glu Ser Leu Arg Ile
325 330 335

Ser Leu Ser Pro Gln Asn Thr Val Glu Asp Leu Gln Thr Leu Ala Lys
340 345 350

Thr Leu Lys Glu Ile Ile Gly Gly
355 360

<210> 85

<211> 459

<212> PRT

<213> Streptococcus pneumoniae

<400> 85

Met Leu Phe Lys Leu Ser Lys Glu Lys Ile Glu Leu Gly Leu Ser Arg
1 5 10 15

Leu Ser Pro Ala Arg Arg Ile Phe Leu Ser Phe Ala Leu Val Ile Leu
20 25 30

L u Gly S r Leu Leu Leu Ser Leu Pro Phe Val Gln Val Glu Ser Ser
35 40 45

00760767 043604

Arg Ala Thr Tyr Phe Asp His Leu Phe Thr Ala Val Ser Ala Val Cys
50 55 60

Val Thr Gly Leu Ser Thr Leu Pro Val Ala His Thr Tyr Asn Ile Trp
65 70 75 80

Gly Gln Ile Ile Cys Leu Leu Leu Ile Gln Ile Gly Gly Leu Gly Leu
85 90 95

Met Thr Phe Ile Gly Val Phe Tyr Ile Gln Ser Lys Gln Lys Leu Ser
100 105 110

Leu Arg Ser Arg Ala Thr Ile Gln Asp Ser Phe Ser Tyr Gly Glu Thr
115 120 125

Arg Ser Leu Arg Lys Phe Val Tyr Ser Ile Phe Leu Thr Thr Phe Leu
130 135 140

Val Glu Ser Leu Gly Ala Ile Leu Leu Ser Phe Arg Leu Ile Pro Gln
145 150 155 160

Leu Gly Trp Gly Arg Gly Leu Phe Ser Ser Ile Phe Leu Ala Ile Ser
165 170 175

Ala Phe Cys Asn Ala Gly Phe Asp Asn Leu Gly Ser Thr Ser Leu Phe
180 185 190

Ala Phe Gln Thr Asp Leu Leu Val Asn Leu Val Ile Ala Gly Leu Ile
195 200 205

Ile Thr Gly Gly Leu Gly Phe Met Val Trp Phe Asp Leu Ala Gly His
210 215 220

Val Gly Arg Lys Lys Lys Gly Arg Leu His Phe His Thr Lys Leu Val
225 230 235 240

Leu Leu Leu Thr Ile Gly Leu Leu Leu Phe Gly Thr Ala Thr Thr Leu
245 250 255

00760787 043604
T09270 28289250

Phe Leu Glu Trp Asn Asn Ala Gly Thr Ile Gly Asn Leu Pro Val Ala
 260 265 270

Asp Lys Val Leu Val Ser Phe Phe Gln Thr Val Thr Met Arg Thr Ala
 275 280 285

Gly Phe Ser Thr Ile Asp Tyr Thr Gln Ala His Pro Val Thr Leu Leu
 290 295 300

Ile Tyr Ile Leu Gln Met Phe Leu Gly Gly Ala Pro Gly Gly Thr Ala
 305 310 315 320

Gly Gly Leu Lys Ile Thr Thr Phe Phe Val Leu Leu Val Phe Ala Arg
 325 330 335

Ser Glu Leu Leu Gly Leu Pro His Ala Asn Val Ala Arg Arg Thr Ile
 340 345 350

Ala Pro Arg Thr Val Gln Lys Ser Phe Ser Val Phe Ile Ile Phe Leu
 355 360 365

Met Ser Phe Leu Ile Gly Leu Ile Leu Leu Gly Ile Thr Ala Lys Gly
 370 375 380

Asn Pro Pro Phe Ile His Leu Val Phe Glu Thr Ile Ser Ala Leu Ser
 385 390 395 400

Thr Val Gly Val Thr Ala Asn Leu Thr Pro Asp Leu Gly Lys Leu Ala
 405 410 415

Leu Ser Val Ile Met Pro Leu Met Phe Met Gly Arg Ile Gly Pro Leu
 420 425 430

Thr Leu Phe Val Ser Leu Ala Asp Tyr His Pro Glu Lys Lys Asp Met
 435 440 445

Ile His Tyr Met Lys Ala Asp Ile Ser Ile Gly
 450 455

00350767 043601
 1095210 20265260

<210> 86

<211> 221

<212> PRT

<213> Streptococcus pneumoniae

<400> 86

Met Ser Asp Arg Thr Ile Gly Ile Leu Gly Leu Gly Ile Phe Gly Ser
 1 5 10 15

Ser Val Leu Ala Ala Leu Ala Lys Gln Asp Met Asn Ile Ile Ala Ile
 20 25 30

Asp Asp His Ala Glu Arg Ile Asn Gln Phe Glu Pro Val Leu Ala Arg
 35 40 45

Gly Val Ile Gly Asp Ile Thr Asp Glu Glu Leu Leu Arg Ser Ala Gly
 50 55 60

Ile Asp Thr Cys Asp Thr Val Val Val Ala Thr Gly Glu Asn Leu Glu
 65 70 75 80

Ser Ser Val Leu Ala Val Met His Cys Lys Ser Leu Gly Val Pro Thr
 85 90 95

Val Ile Ala Lys Val Lys Ser Gln Thr Ala Lys Lys Val Leu Glu Lys
 100 105 110

Ile Gly Ala Asp Ser Val Ile Ser Pro Glu Tyr Glu Met Gly Gln Ser
 115 120 125

Leu Ala Gln Thr Ile Leu Phe His Asn Ser Val Asp Val Phe Gln Leu
 130 135 140

Asp Lys Asn Val Ser Ile Val Glu Met Lys Ile Pro Gln Ser Trp Ala
 145 150 155 160

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 109210-28269260

196

Gly Gln Ser Leu Ser Lys Leu Asp Leu Arg Gly Lys Tyr Asn Leu Asn
165 170 175

Ile Leu Gly Phe Arg Glu Gln Glu Asn Ser Pro Leu Asp Val Glu Phe
180 185 190

Gly Pro Asp Asp Leu Leu Lys Ala Asp Thr Tyr Ile Leu Ala Val Ile
195 200 205

Asn Asn Gln Tyr Leu Asp Thr Leu Val Ala Leu Asn Ser
210 215 220

<210> 87

<211> 179

<212> PRT

<213> Streptococcus pneumoniae

<400> 87

Met Lys Leu Leu Ser Ile Ala Ile Ser Ser Tyr Asn Ala Ala Ala Tyr
1 5 10 15

Leu His Tyr Cys Val Glu Ser Leu Val Ile Gly Gly Glu Gln Val Gly
20 25 30

Ile Leu Ile Ile Asn Asp Gly Ser Gln Asp Gln Thr Gln Glu Ile Ala
35 40 45

Glu Cys Leu Ala Ser Lys Tyr Pro Asn Ile Val Arg Ala Ile Tyr Gln
50 55 60

Glu Asn Lys Cys His Gly Gly Ala Val Asn Arg Gly Leu Val Glu Ala
65 70 75 80

Ser Gly Arg Tyr Phe Lys Val Val Asp Ser Asp Asp Trp Val Asp Pro
85 90 95

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F09210 28269260

197

Arg Ala Tyr Leu Lys Ile Leu Glu Thr Leu Gln Glu Leu Glu Ser Lys
100 105 110

Gly Gln Glu Val Asp Val Phe Val Thr Asn Phe Val Tyr Glu Lys Glu
115 120 125

Gly Gln Ser Arg Lys Lys Ser Met Ser Tyr Asp Ser Val Leu Pro Val
130 135 140

Arg Gln Ile Phe Gly Trp Asp Gln Val Gly Asn Phe Ser Lys Gly Gln
145 150 155 160

Tyr Thr Met Met His Ser Leu Ile Tyr Arg Thr Asp Leu Leu Arg Ala
165 170 175

Ser Gln Phe

<210> 88

<211> 623

<212> PRT

<213> Streptococcus pneumoniae

<400> 88

Met Lys Phe Asn Pro Asn Gln Arg Tyr Thr Arg Trp Ser Ile Arg Arg
1 5 10 15

Leu Ser Val Gly Val Ala Ser Val Val Val Ala Ser Gly Phe Phe Val
20 25 30

Leu Val Gly Gln Pro Ser Ser Val Arg Ala Asp Gly Leu Asn Pro Thr
35 40 45

Pro Gly Gln Val Leu Pro Glu Glu Thr Ser Gly Thr Lys Glu Gly Asp
50 55 60

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109370-28269260

Leu Ser Glu Lys Pro Gly Asp Thr Val Leu Thr Gln Ala Lys Pro Glu
65 70 75 80

Gly Val Thr Gly Asn Thr Asn Ser Leu Pro Thr Pro Thr Glu Arg Thr
85 90 95

Glu Val Ser Glu Glu Thr Ser Pro Ser Ser Leu Asp Thr Leu Phe Glu
100 105 110

Lys Asp Glu Glu Ala Gln Lys Asn Pro Glu Leu Thr Asp Val Leu Lys
115 120 125

Glu Thr Val Asp Thr Ala Asp Val Asp Gly Thr Gln Ala Ser Pro Ala
130 135 140

Glu Thr Thr Pro Glu Gln Val Lys Gly Gly Val Lys Glu Asn Thr Lys
145 150 155 160

Asp Ser Ile Asp Val Pro Ala Ala Tyr Leu Glu Lys Ala Glu Gly Lys
165 170 175

Gly Pro Phe Thr Ala Gly Val Asn Gln Val Ile Pro Tyr Glu Leu Phe
180 185 190

Ala Gly Asp Gly Met Leu Thr Arg Leu Leu Leu Lys Ala Ser Asp Asn
195 200 205

Ala Pro Trp Ser Asp Asn Gly Thr Ala Lys Asn Pro Ala Leu Pro Pro
210 215 220

Leu Glu Gly Leu Thr Lys Gly Lys Tyr Phe Tyr Glu Val Asp Leu Asn
225 230 235 240

Gly Asn Thr Val Gly Lys Gln Gly Gln Ala Leu Ile Asp Gln Leu Arg
245 250 255

Ala Asn Gly Thr Gln Thr Tyr Lys Ala Thr Val Lys Val Tyr Gly Asn
260 265 270

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T09270 28289280

Lys Asp Gly Lys Ala Asp Leu Thr Asn Leu Val Ala Thr Lys Asn Val
 275 280 285

Asp Ile Asn Ile Asn Gly Leu Val Ala Lys Glu Thr Val Gln Lys Ala
 290 295 300

Val Ala Asp Asn Val Lys Asp Ser Ile Asp Val Pro Ala Ala Tyr Leu
 305 310 315 320

Glu Lys Ala Lys Gly Glu Gly Pro Phe Thr Ala Gly Val Asn His Val
 325 330 335

Ile Pro Tyr Glu Leu Phe Ala Gly Asp Gly Met Leu Thr Arg Leu Leu
 340 345 350

Leu Lys Ala Ser Asp Lys Ala Pro Trp Ser Asp Asn Gly Asp Ala Lys
 355 360 365

Asn Pro Ala Leu Ser Pro Leu Gly Glu Asn Val Lys Thr Lys Gly Gln
 370 375 380

Tyr Phe Tyr Gln Val Ala Leu Asp Gly Asn Val Ala Gly Lys Glu Lys
 385 390 395 400

Gln Ala Leu Ile Asp Gln Phe Arg Ala Asn Gly Thr Gln Thr Tyr Ser
 405 410 415

Ala Thr Val Asn Val Tyr Gly Asn Lys Asp Gly Lys Pro Asp Leu Asp
 420 425 430

Asn Ile Val Ala Thr Lys Lys Val Thr Ile Asn Ile Asn Gly Leu Ile
 435 440 445

Ser Lys Glu Thr Val Gln Lys Ala Val Ala Asp Asn Val Lys Asp Ser
 450 455 460

Ile Asp Val Pro Ala Ala Tyr Leu Glu Lys Ala Lys Gly Glu Gly Pro
 465 470 475 480

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200

Phe Thr Ala Gly Val Asn His Val Ile Pro Tyr Glu Leu Phe Ala Gly
485 490 495

Asp Gly Met Leu Thr Arg Leu Leu Leu Lys Ala Ser Asp Lys Ala Pro
500 505 510

Trp Ser Asp Asn Gly Asp Ala Lys Asn Pro Ala Leu Ser Pro Leu Gly
515 520 525

Glu Asn Val Lys Thr Lys Gly Gln Tyr Phe Tyr Gln Leu Ala Leu Asp
530 535 540

Gly Asn Val Ala Gly Lys Glu Lys Gln Ala Leu Ile Asp Gln Phe Arg
545 550 555 560

Ala Asn Gly Thr Gln Thr Tyr Ser Ala Thr Val Asn Val Tyr Gly Asn
565 570 575

Lys Asp Gly Lys Pro Asp Leu Asp Asn Ile Val Ala Thr Lys Lys Val
580 585 590

Thr Ile Asn Ile Asn Gly Leu Ile Ser Lys Glu Thr Val Gln Lys Ala
595 600 605

Val Ala Asp Asn Val Lys Thr Val Ser Met Phe Gln Gln Pro Thr
610 615 620

<210> 89

<211> 350

<212> PRT

<213> Streptococcus pneumoniae

<400> 89

Met Lys Leu Lys Ser Tyr Ile Leu Val Gly Tyr Ile Ile Ser Thr Leu

1

5

10

15

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PAGE 10 20250260

201

Leu Thr Ile Leu Val Val Phe Trp Ala Val Gln Lys Met Leu Ile Ala
20 25 30

Lys Gly Glu Ile Tyr Phe Leu Leu Gly Met Thr Ile Val Ala Ser Leu
35 40 45

Val Gly Ala Gly Ile Ser Leu Phe Leu Leu Leu Pro Val Phe Thr Ser
50 55 60

Leu Gly Lys Leu Lys Glu His Ala Lys Arg Val Ala Ala Lys Asp Phe
65 70 75 80

Pro Ser Asn Leu Glu Val Gln Gly Pro Val Glu Phe Gln Gln Leu Gly
85 90 95

Gln Thr Phe Asn Glu Met Ser His Asp Leu Gln Val Ser Phe Asp Ser
100 105 110

Leu Glu Glu Ser Glu Arg Glu Lys Gly Leu Met Ile Ala Gln Leu Ser
115 120 125

His Asp Ile Lys Thr Pro Ile Thr Ser Ile Gln Ala Thr Val Glu Gly
130 135 140

Ile Leu Asp Gly Ile Ile Lys Glu Ser Glu Gln Ala His Tyr Leu Ala
145 150 155 160

Thr Ile Gly Arg Gln Thr Glu Arg Leu Asn Lys Leu Val Glu Glu Leu
165 170 175

Asn Phe Leu Thr Leu Asn Thr Ala Arg Asn Gln Val Glu Thr Thr Ser
180 185 190

Lys Asp Ser Ile Phe L u Asp Lys Leu Leu Ile Glu Cys Met Ser Glu
195 200 205

Phe Gln Phe Leu Ile Glu Gln Glu Arg Arg Asp Val His Leu Gln Val
210 215 220

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202

Ile Pro Glu Ser Ala Arg Ile Glu Gly Asp Tyr Ala Lys Leu Ser Arg
225 230 235 240

Ile Leu Val Asn Leu Val Asp Asn Ala Phe Lys Tyr Ser Ala Pro Gly
245 250 255

Thr Lys Leu Glu Val Val Ala Lys Leu Glu Lys Asp Gln Leu Ser Ile
260 265 270

Ser Val Thr Asp Glu Gly Gln Gly Ile Ala Pro Glu Asp Leu Glu Asn
275 280 285

Ile Phe Lys Arg Leu Tyr Arg Val Glu Thr Ser Arg Asn Met Lys Thr
290 295 300

Gly Gly His Gly Leu Gly Leu Ala Ile Ala Arg Glu Leu Ala His Gln
305 310 315 320

Leu Gly Gly Glu Ile Thr Val Ser Ser Gln Tyr Gly Leu Gly Ser Thr
325 330 335

Phe Thr Leu Val Leu Asn Leu Ser Gly Ser Glu Asn Lys Ala
340 345 350

<210> 90

<211> 175

<212> PRT

<213> Streptococcus pneumoniae

<400> 90

Met Phe Gly Gln Thr Ala Gln His Gly Leu Thr Asn Ser Leu Lys Asp
1 5 10 15

Phe Trp Ile Phe Leu Leu Asn Ile Gly Pro Gln Leu Ala Phe Phe Cys
20 25 30

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203

Gln Met Leu Arg Cys Ser Arg Ser Val Glu Gln Gly Thr Gly Asn His
35 40 45

Arg Arg Glu Phe Asn Met Ile Gln Gln Ile Phe Ser His Phe Gly Met
50 55 60

Thr His Leu Gly Gln Ile Lys Leu Val Tyr Gln Glu Ser Ile Asp Leu
65 70 75 80

Glu Leu Leu Val Asn Ala Leu Asn His His Leu Leu Ile Asp Arg Leu
85 90 95

Val Leu Thr Pro Asn Gln Ile Thr Ile Glu Ile Asp Arg Gln Ile Val
100 105 110

His Gly Leu Asp Leu Leu Lys Gly Arg Lys Asp Lys Glu Ile Ile Asp
115 120 125

Ile Lys Ser Met Phe Arg Gln Leu Glu Leu Ala Ser Thr Gln Gln Ile
130 135 140

Cys Pro Ile Asn Gln Arg Val His His Gly Ile Leu Ala Phe Gly Glu
145 150 155 160

Ile Ser Asp Leu Val Pro Ala Lys Asn Leu Pro Asn Arg Gln Asp
165 170 175

<210> 91

<211> 158

<212> PRT

<213> Streptococcus pneumoniae

<400> 91

Met Glu His Leu Ala Thr Tyr Phe Ser Thr Tyr Gly Gly Ala Phe Phe

1

5

10

15

105670 105670

[illegible]

15

<213> Streptococcus pneumoniae

Met Ser Val Leu Glu Ile Lys Asp Leu His Val Glu Ile Glu Gly Lys
1 5 10 15

Glu Ile Leu Lys Gly Val Asn Leu Thr Leu Lys Thr Gly Glu Ile Ala
20 25 30

Ala Ile Met Gly Pro Asn Gly Thr Gly Lys Ser Thr Leu Ser Ala Ala
35 40 45

Ile Met Gly Asn Pro Asn Tyr Glu Val Thr Lys Gly Glu Val Leu Phe
50 55 60

Asp Gly Val Asn Ile Leu Glu Leu Glu Val Asp Glu Arg Ala Arg Met
65 70 75 80

Gly Leu Phe Leu Ala Met Gln Tyr Pro Ser Glu Ile Pro Gly Ile Thr
85 90 95

Asn. Ala Glu Phe Leu Arg Ala Ala Met Asn Ala Gly Lys Glu Asp Asp
100 105 110

Glu Lys Ile Ser Val Arg Glu Phe Ile Thr Lys Leu Asp Glu Lys Met
115 120 125

Glu Leu Leu Asn Met Lys Glu Glu Met Ala Glu Arg Tyr Leu Asn Glu
130 135 140

Gly Phe Ser Gly Gly Glu Lys Lys Arg Asn Glu Ile Leu Gln Leu Leu
145 150 155 160

Met Leu Glu Pro Thr Phe Ala Leu Leu Asp Glu Ile Asp Ser Gly Leu
165 170 175

207

Asp Il Asp Ala Leu Lys Val Val Ser Lys Gly Val Asn Ala Met Arg
180 185 190

Gly Glu Gly Phe Gly Ala Met Ile Ile Thr His Tyr Gln Arg Leu Leu
195 200 205

Asn Tyr Ile Thr Pro Asp Val Val His Val Met Met Glu Gly Arg Val
210 215 220

Val Leu Ser Gly Gly Pro Glu Leu Ala Ala Arg Leu Glu Arg Glu Gly
225 230 235 240

Tyr Ala Lys Leu Ala Glu Glu Leu Gly Tyr Asp Tyr Lys Glu Glu Leu
245 250 255

<210> 94

<211> 156

<212> PRT

<213> Streptococcus pneumoniae

<400> 94

Met Pro Tyr Lys Arg Gln Arg Ser Phe Ser Met Ala Leu Ser Lys Leu
1 5 10 15

Asp Ser Leu Tyr Met Ala Val Val Ala Asp His Ser Lys Asn Pro His
20 25 30

His Gln Gly Lys Leu Glu Asp Ala Glu Gln Ile Ser Leu Asn Asn Pro
35 40 45

Thr Cys Gly Asp Val Ile Asn Leu Ser Val Lys Ph Asp Ala Glu Asp
50 55 60

THE **NEW** **YORK** **PUBLIC** **LIBRARY**

Met Ala Ala Ile Asn Thr Ala Met Asn Asp Phe Leu Gly Gly Leu Gly
465 470 475 480

<210> 96

<211> 767

<212> PRT

<213> Streptococcus pneumoniae

<400> 96

Met Ala Asn Lys Asn Thr Ser Thr Thr Arg Arg Arg Pro Ser Lys Ala

1 5 10 15

Glu Leu Glu Arg Lys Glu Ala Ile Gln Arg Met Leu Ile Ser Leu Gly

20 25 30

Ile Ala Ile Leu Leu Ile Phe Ala Ala Phe Lys Leu Gly Ala Ala Gly

35 40 45

Ile Thr Leu Tyr Asn Leu Ile Arg Leu Leu Val Gly Ser Leu Ala Tyr

50 55 60

Leu Ala Ile Phe Gly Leu Leu Ile Tyr Leu Phe Phe Phe Lys Trp Ile

65 70 75 80

Arg Lys Gln Glu Gly Leu Leu Ser Gly Phe Phe Thr Ile Phe Ala Gly

85 90 95

Leu Leu Leu Ile Phe Glu Ala Tyr Leu Val Trp Lys Tyr Gly Leu Asp

100 105 110

Lys Ser Val Leu Lys Gly Thr Met Ala Gln Val Val Thr Asp Leu Thr

115 120 125

Gly Phe Arg Thr Thr Ser Phe Ala Gly Gly Gly Leu Ile Gly Val Ala

130 135 140

Leu Tyr Ile Pro Thr Ala Phe Leu Phe Ser Asn Ile Gly Thr Tyr Phe

145 150 155 160

Ile Gly Ser Ile Leu Ile Leu Val Gly Ser Leu Leu Val Ser Pro Trp

165 170 175

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Glu Asp Ala Ile Ile Arg Leu Gly Gln Lys Ala Arg Ala Ala Gly Ile
580 585 590

[illegible]

Leu Ile Lys Ala Asn Val Pro Ser Arg Val Ala Phe Ala Val Ser Ser
610 615 620

Gly Thr Asp Ser Arg Thr Ile Leu Asp Glu Asn Gly Ala Glu Lys Leu
625 630 635 640

Leu Gly Arg Gly Asp Met Leu Phe Lys Pro Ile Asp Glu Asn His Pro
645 650 655

Val Arg Leu Gln Gly Ser Phe Ile Ser Asp Asp Asp Val Glu Arg Ile
660 665 670

Val Asn Phe Ile Lys Thr Gln Ala Asp Ala Asp Tyr Asp Glu Ser Phe
675 680 685

Asp Pro Gly Glu Val Ser Glu Asn Glu Gly Glu Phe Ser Asp Gly Asp
690 695 700

Ala Gly Gly Asp Pro Leu Phe Glu Glu Ala Lys Ser Leu Val Ile Glu
705 710 715 720

Thr Gln Lys Ala Ser Ala Ser Met Ile Gln Arg Arg Leu Ser Val Gly
725 730 735

Phe Asn Arg Ala Thr Arg Leu Met Glu Glu Leu Glu Ile Ala Gly Val
740 745 750

Ile Gly Pro Ala Glu Gly Thr Lys Pro Arg Lys Val Leu Gln Gln
755 760 765

<213> Streptococcus pneumoniae

Met Ser Tyr Phe Lys Lys Tyr Lys Phe Asp Lys Ser Gln Phe Lys Leu
1 5 10 15

Gly Met Arg Thr Phe Lys Thr Gly Ile Ala Val Phe Leu Val Leu Leu
20 25 30

Ile Phe Gly Phe Phe Gly Trp Lys Gly Leu Gln Ile Gly Ala Leu Thr
35 40 45

Ala Val Phe Ser Leu Arg Glu Ser Phe Asp Glu Ser Val His Phe Gly
50 55 60

Thr Ser Arg Ile Leu Gly Asn Ser Ile Gly Gly Leu Tyr Ala Leu Val
65 70 75 80

Phe Phe Leu Leu Asn Thr Phe Phe His Glu Ala Phe Trp Val Thr Leu
85 90 95

Val Val Val Pro Ile Cys Thr Met Leu Thr Ile Met Thr Asn Val Ala
100 105 110

Met Asn Asn Lys Ala Gly Val Ile Gly Gly Val Ala Ala Met Leu Ile
115 120 125

Ile Thr Leu Ser Ile Pro Ser Gly Glu Thr Ile Leu Tyr Val Phe Val
130 135 140

Arg Val Leu Glu Thr Phe Met Gly Val Phe Val Ala Ile Ile Val Asn
145 150 155 160

Tyr Asp Ile Asp Arg Ile Arg Leu Phe Leu Glu Lys Lys Glu Lys
165 170 175

<210> 98

<211> 156

<212> PRT

<213> Streptococcus pneumoniae

<400> 98

Met Asn Lys Ser Glu His Arg His Gln Leu Ile Arg Ala Leu Ile Thr
 1 5 10 15

Lys Asn Lys Ile His Thr Gln Ala Glu Leu Gln Ala Leu Leu Ala Glu
 20 25 30

Asn Asp Ile Gln Val Thr Gln Ala Thr Leu Ser Arg Asp Ile Lys Asn
 35 40 45

Met Asn Leu Ser Lys Val Arg Glu Glu Asp Ser Ala Tyr Tyr Val Leu
 50 55 60

Asn Asn Gly Ser Ile Ser Lys Trp Glu Lys Arg Leu Glu Leu Tyr Met
 65 70 75 80

Glu Asp Ala Leu Val Trp Met Arg Pro Val Gln His Gln Val Leu Leu
 85 90 95

Lys Thr Leu Pro Gly Leu Ala Gln Ser Phe Gly Ser Ile Ile Asp Thr
 100 105 110

Leu Ser Phe Pro Asp Ala Ile Ala Thr Leu Cys Gly Asn Asp Val Cys
 115 120 125

Leu Ile Ile Cys Glu Asp Ala Asp Thr Ala Gln Lys Cys Phe Glu Glu
 130 135 140

Leu Lys Lys Phe Ala Pro Pro Phe Phe Phe Glu Glu
 145 150 155

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<213> Streptococcus pneumoniae

Met Lys Ser Ile Lys Leu Asn Ala Leu Ser Tyr Met Gly Ile Arg Val
1 5 10 15

Leu Asn Ile Ile Phe Pro Ile Leu Thr Gly Thr Tyr Val Ala Arg Val
20 25 30

Leu Asp Arg Thr Asp Tyr Gly Tyr Phe Asn Ser Val Asp Thr Ile Leu
35 40 45

Ser Phe Phe Leu Pro Phe Ala Thr Tyr Gly Val Tyr Asn Tyr Gly Leu
50 55 60

Arg Ala Ile Ser Asn Val Lys Asp Asn Lys Lys Asp Leu Asn Arg Thr
65 70 75 80

Phe Ser Ser Leu Phe Tyr Leu Cys Ile Ala Cys Thr Ile Leu Thr Thr
85 90 95

Ala Val Tyr Ile Leu Ala Tyr Pro Leu Phe Phe Thr Asp Asn Pro Ile
100 105 110

Val Lys Lys Val Tyr Leu Val Met Gly Ile Gln Leu Ile Ala Gln Ile
115 120 125

Phe Ser Ile Glu Trp Val Asn Glu Ala Leu Glu Asn Tyr Ser Phe Leu
130 135 140

Phe Tyr Lys Thr Ala Phe Ile Arg Ile Leu Met Leu Val Ser Ile Phe
145 150 155 160

Leu Phe Val Lys Asn Glu His Asp Ile Val Val Tyr Thr Leu Val Met
165 170 175

220

Tyr Tyr Leu Leu Thr Thr Met Leu Ser Glu Thr Ser Leu Leu Val Phe
385 390 395 400

Tyr Ile Ile Phe Ile His Arg Lys Gln Leu Ile His Leu Gly His Ile
405 410 415

Phe Ser Tyr Thr Val Arg Tyr Ser Leu Phe Ser Leu Ser Phe Val Ala
420 425 430

Ile Tyr Phe Leu Ile Asn Phe Val Tyr Pro Val Asp Met Val Ile Asn
435 440 445

Leu Pro Phe Leu Ile Asn Thr Gly Leu Ile Val Leu Leu Ser Ala Ile
450 455 460

Ser Tyr Ile Ser Leu Leu Val Phe Thr Lys Asp Ser Ile Phe Tyr Glu
465 470 475 480

Phe Leu Asn His Val Leu Ala Leu Lys Asn Lys Phe Lys Lys Ser
485 490 495

<210> 100

<211> 286

<212> PRT

<213> Streptococcus pneumoniae

<400> 100

Met Glu Leu Phe Met Lys Ile Thr Asn Tyr Glu Ile Tyr Lys Leu Lys
1 5 10 15

Lys Ser Gly Leu Thr Asn Gln Gln Ile Leu Lys Val Leu Glu Tyr Gly
20 25 30

Glu Asn Val Asp Gln Glu Leu Leu Leu Gly Asp Ile Ala Asp Ile Ser
35 40 45

103210 286960

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Leu Val Thr Ser Gly Gln Asp Val Leu Ala Glu Phe Glu Phe
275 280 285

<211> 267.

<213> Streptococcus pneumoniae

Met Lys Gln Leu Thr Val Glu Asp Ala Lys Gln Ile Glu Leu Glu Ile
1 5 10 15

Ile Asn Tyr Gly Thr Leu Ile Gly Ala Val Arg His Glu Gly Phe Ile
35 40 45

Arg Phe Ile Asn Ile Phe Gln Lys Glu Lys Ser Lys Tyr Lys Leu Leu
65 70 75 80

Asp Ser Thr Thr Lys Ile Ile Asp Thr Arg Asn Thr Lys Thr Tyr Glu
100 105 110

Ser Gly Ile Phe Ile Asp Ile Phe Pro Ile Asp Arg Phe Asp Asp Pro
115 120 125

[illegible]

15

224

Asp Leu Val Ser Asp Leu Thr Met Thr Ile Gln Asp Gly Glu Lys Val
20 25 30

Ala Ile Ile Gly Glu Glu Gly Asn Gly Lys Ser Thr Leu Leu Lys Ile
35 40 45

Leu Met Gly Glu Ala Leu Ser Asp Phe Thr Ile Lys Gly Asn Ile Gln
50 55 60

Ser Asp Tyr Gln Ser Leu Ala Tyr Ile Pro Gln Lys Val Pro Glu Asp
65 70 75 80

Leu Lys Lys Lys Thr Leu His Asp Tyr Phe Phe Leu Asp Ser Ile Asp
85 90 95

Leu Asp Tyr Ser Ile Leu Tyr Arg Leu Ala Glu Glu Leu His Phe Asp
100 105 110

Ser Asn Arg Phe Ala Ser Asp Gln Glu Ile Gly Asn Leu Ser Gly Gly
115 120 125

Glu Ala Leu Lys Ile Gln Leu Ile His Glu Leu Ala Lys Pro Phe Glu
130 135 140

Ile Leu Phe Leu Asp Glu Pro Ser Asn Asp Leu Asp Leu Glu Thr Val
145 150 155 160

Asp Trp Leu Lys Gly Gln Ile Gln Lys Thr Arg Gln Thr Val Ile Phe
165 170 175

Ile Ser His Asp Glu Asp Phe Leu Ser Glu Thr Ala Asp Thr Ile Val
180 185 190

His Leu Arg Leu Val Lys His Arg Lys Glu Ala Glu Thr Leu Val Glu
195 200 205

His Leu Asp Tyr Asp Ser Tyr Ser Glu Gln Arg Lys Ala Asn Phe Ala
210 215 220

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Lys Leu Leu Leu Leu Asp Leu Val Leu Arg Lys Pro Asn Phe Leu Leu
 435 440 445

Leu Asp Glu Pro Thr Arg Asn Phe Ser Pro Thr Ser Gln Pro Gln Ile
 450 455 460

Arg Lys Leu Phe Ala Thr Tyr Pro Gly Gly Leu Ile Thr Val Ser His
 465 470 475 480

Asp Arg Arg Phe Leu Lys Glu Val Cys Ser Ile Ile Tyr Arg Met Thr
 485 490 495

Glu His Gly Leu Lys Leu Val Asn Leu Glu Asp Leu
 500 505

<210> 103

<211> 237

<212> PRT

<213> Streptococcus pneumoniae

<400> 103

Met Lys Pro Lys Thr Phe Tyr Asn Leu Leu Ala Glu Gln Asn Leu Pro
 1 5 10 15

Leu Ser Asp Gln Gln Lys Glu Gln Phe Glu Arg Tyr Phe Glu Leu Leu
 20 25 30

Val Glu Trp Asn Glu Lys Ile Asn Leu Thr Ala Ile Thr Asp Lys Glu
 35 40 45

Glu Val Tyr Leu Lys His Phe Tyr Asp Ser Ile Ala Pro Ile Leu Gln
 50 55 60

Gly Leu Ile Pro Asn Glu Thr Ile Lys Leu Leu Asp Ile Gly Ala Gly
 65 70 75 80

FOAETD 2828250

227

Ala Gly Phe Pro Ser Leu Pro Met Lys Ile Leu Tyr Pro Glu Leu Asp
85 90 95

Val Thr Ile Ile Asp Ser Leu Asn Lys Arg Ile Asn Phe Leu Gln Leu
100 105 110

Leu Ala Gln Glu Leu Asp Leu Asn Gly Val His Phe Tyr His Gly Arg
115 120 125

Ala Glu Asp Phe Ala Gln Asp Lys Asn Phe Arg Ala Gln Tyr Asp Phe
130 135 140

Val Thr Ala Arg Ala Val Ala Arg Met Gln Val Leu Ser Glu Leu Thr
145 150 155 160

Ile Pro Tyr Leu Lys Val Gly Gly Lys Leu Leu Ala Leu Lys Ala Ser
165 170 175

Asn Ala Pro Glu Glu Leu Leu Glu Ala Lys Asn Ala Leu Asn Leu Leu
180 185 190

Phe Ser Lys Val Glu Asp Asn Leu Ser Tyr Ala Leu Pro Asn Arg Asp
195 200 205

Pro Arg Tyr Ile Thr Val Val Glu Lys Lys Lys Glu Thr Pro Asn Lys
210 215 220

Tyr Pro Arg Lys Ala Gly Met Pro Asn Lys Arg Pro Leu
225 230 235

<210> 104

<211> 268

<212> PRT

<213> Streptococcus pneumoniae

<400> 104

Met Ser Ile Lys Leu Ile Ala Val Asp Ile Asp Gly Thr Leu Val Asn
1 5 10 15

109210-28265250

Ser Gln Lys Glu Ile Thr Pro Glu Val Phe Ser Ala Ile Gln Asp Ala
 20 25 30

Lys Glu Ala Gly Val Lys Val Val Ile Ala Thr Gly Arg Pro Ile Ala
 35 40 45

Gly Val Ala Lys Leu Leu Asp Asp Leu Gln Leu Arg Asp Glu Gly Asp
 50 55 60

Tyr Val Val Thr Phe Asn Gly Ala Leu Val Gln Glu Thr Ala Thr Gly
 65 70 75 80

His Glu Ile Ile Ser Glu Ser Leu Thr Tyr Glu Asp Tyr Leu Asp Met
 85 90 95

Glu Phe Leu Ser Arg Lys Leu Gly Val His Met His Ala Ile Thr Lys
 100 105 110

Asp Gly Ile Tyr Thr Ala Asn Arg Asn Ile Gly Lys Tyr Thr Val His
 115 120 125

Glu Ser Thr Leu Val Ser Met Pro Ile Phe Tyr Arg Thr Pro Glu Glu
 130 135 140

Met Ala Gly Lys Glu Ile Val Lys Cys Met Phe Ile Asp Glu Pro Glu
 145 150 155 160

Ile Leu Asp Ala Ala Ile Glu Lys Ile Pro Ala Glu Phe Tyr Glu Arg
 165 170 175

Tyr Ser Ile Asn Lys Ser Ala Pro Phe Tyr Leu Glu Leu Leu Lys Lys
 180 185 190

Asn Val Asp Lys Gly Ser Ala Ile Thr His Leu Ala Glu Lys Leu Gly
 195 200 205

Leu Thr Lys Asp Glu Thr Met Ala Ile Gly Asp Glu Glu Asn Asp Arg
 210 215 220

00969787-042604

229

Ala Met Leu Glu Val Val Gly Asn Pro Val Val Met Glu Asn Gly Asn
225 230 235 240

Pro Glu Ile Lys Lys Ile Ala Lys Tyr Ile Thr Lys Thr Asn Asp Glu
245 250 255

Ser Gly Val Ala His Ala Ile Arg Thr Trp Val Leu
260 265

<210> 105

<211> 186

<212> PRT

<213> Streptococcus pneumoniae

<400> 105

Met Thr Trp Ile Ile Leu Gly Val Ile Ala Leu Ile Val Ile Phe Val
1 5 10 15

Ile Val Ser Tyr Asn Gly Leu Val Lys Asn Arg Met Gln Thr Lys Glu
20 25 30

Ala Trp Ser Gln Ile Asp Val Gln Leu Lys Arg Arg Asn Asp Leu Leu
35 40 45

Pro Asn Leu Ile Glu Thr Val Lys Gly Tyr Ala Lys Tyr Glu Gly Ser
50 55 60

Thr Leu Glu Lys Val Ala Glu Leu Arg Asn Gln Val Ala Ala Ala Thr
65 70 75 80

Ser Pro Ala Glu Ala Met Lys Ala Ser Asp Ala Leu Thr Arg Gln Val
85 90 95

Ser Gly Ile Phe Ala Val Ala Glu Ser Tyr Pro Asp Leu Lys Ala Ser
100 105 110

00760701012501

230

Ala Asn Phe Val Lys Leu Gln Glu Glu Leu Thr Asn Thr Glu Asn Lys
115 120 125

Ile Ser Tyr Ser Arg Gln Leu Tyr Asn Ser Val Val Ser Asn Tyr Asn
130 135 140

Val Lys Leu Glu Thr Phe Pro Ser Asn Ile Ile Ala Gly Met Phe Gly
145 150 155 160

Phe Lys Ala Ala Asp Phe Leu Gln Thr Pro Glu Glu Glu Lys Ser Val
165 170 175

Pro Lys Val Asp Phe Ser Gly Leu Gly Asp
180 185

<210> 106

<211> 299

<212> PRT

<213> Streptococcus pneumoniae

<400> 106

Met Leu Phe Asp Gln Ile Ala Ser Asn Lys Arg Lys Thr Trp Ile Leu
1 5 10 15

Leu Leu Val Phe Phe Leu Leu Leu Ala Leu Val Gly Tyr Ala Val Gly
20 25 30

Tyr Leu Phe Ile Arg Ser Gly Leu Gly Gly Leu Val Ile Ala Leu Ile
35 40 45

Ile Gly Phe Ile Tyr Ala Leu Ser Met Ile Phe Gln Ser Thr Glu Ile
50 55 60

Val Met Ser Met Asn Gly Ala Arg Glu Val Asp Glu Gln Thr Ala Pro
65 70 75 80

00760787 012501

231

Asp L u Tyr His Val Val Glu Asp Met Ala Leu Val Ala Gln Ile Pro
85 90 95

Met Pro Arg Val Phe Ile Ile Asp Asp Pro Ala Leu Asn Ala Phe Ala
100 105 110

Thr Gly Ser Asn Pro Gln Asn Ala Ala Val Ala Ala Thr Ser Gly Leu
115 120 125

Leu Ala Ile Met Asn Arg Glu Glu Leu Glu Ala Val Met Gly His Glu
130 135 140

Val Ser His Ile Arg Asn Tyr Asp Ile Arg Ile Ser Thr Ile Ala Val
145 150 155 160

Ala Leu Ala Ser Ala Ile Thr Met Leu Ser Ser Met Ala Gly Arg Met
165 170 175

Met Trp Trp Gly Gly Ala Gly Arg Arg Arg Ser Asp Asp Asp Arg Asp
180 185 190

Gly Asn Gly Leu Glu Ile Ile Met Leu Val Val Ser Leu Leu Ala Ile
195 200 205

Val Leu Ala Pro Leu Ala Ala Thr Leu Val Gln Leu Ala Ile Ser Arg
210 215 220

Gln Arg Glu Phe Leu Ala Asp Ala Ser Ser Val Glu Leu Thr Arg Asn
225 230 235 240

Pro Gln Gly Met Ile Asn Ala Leu Asp Lys Leu Asp Asn Ser Lys Pro
245 250 255

Met Ser Arg His Val Asp Asp Ala Ser Ser Ala Leu Tyr Ile Asn Asp
260 265 270

Pro Lys Lys Gly Gly Gly Phe Gln Lys Leu Phe Tyr Thr His Pro Pro
275 280 285

00769797-01501

Ile Ser Glu Arg Ile Glu Arg Leu Lys Gln Met
 290 295

<210> 107

<211> 180

<212> PRT

<213> Streptococcus pneumoniae

<400> 107

Met Lys Leu Asn Ile Gln Glu Ile Arg Lys Gln Ser Glu Gly Leu Asn
 1 5 10 15

Phe Glu Gln Thr Leu Asp Leu Val Asp Asp Leu Arg Ala Arg Asn Gln
 20 25 30

Glu Ile Leu Asp Val Lys Asp Ile Leu Ala Val Gly Lys Val Gln Tyr
 35 40 45

Glu Asp Arg Met Tyr Phe Leu Asp Tyr Gln Leu Ser Tyr Thr Ile Val
 50 55 60

Leu Ala Ser Ser Arg Ser Met Glu Pro Val Glu Leu Val Glu Ser Tyr
 65 70 75 80

Pro Val Thr Glu Val Phe Met Glu Gly Ala Thr Asn Gln Leu Asp Gln
 85 90 95

Glu Val Leu Asp Asp Asp Leu Val Leu Pro Ile Glu Asn Gly Glu Leu
 100 105 110

Asp Leu Ala Glu Ser Val Ser Asp Asn Ile Leu Leu Asn Ile Pro Ile
 115 120 125

Lys Val Leu Thr Ala Glu Glu Glu Ala Gly Gln Gly Phe Ile Ser Gly
 130 135 140

00260787 012601

233

Asn Asp Trp Gln Ile Met Thr Glu Glu Glu Tyr Gln Ala Gln Lys Ala
145 150 155 160

Val Lys Lys Glu Glu Asn Ser Pro Phe Ala Gly Leu Gln Gly Leu Phe
165 170 175

Asp Gly Asp Glu
180

<210> 108

<211> 177

<212> PRT

<213> Streptococcus pneumoniae

<400> 108

Met Lys Arg Gln Leu Ala Leu Val Val Phe Ser Gly Gly Gln Asp Ser
1 5 10 15

Thr Thr Cys Leu Phe Trp Val Met Gln His Tyr Glu Thr Val Glu Ala
20 25 30

Val Thr Phe Ala Tyr Gly Gln Arg His His Leu Glu Ile Gln Ile Thr
35 40 45

Arg Glu Ile Ala Lys Glu Gln Gly Ile Arg His His Ile Leu Asp Met
50 55 60

Ser Leu Leu Gly Gln Ile Thr Ala Gln Pro Asp Phe Ala Thr Ile His
65 70 75 80

Ile Ser Tyr Ile Pro Asp Lys Leu Cys Val Glu Ser Lys Ser Leu Lys
85 90 95

Leu Tyr Leu Phe Ser Tyr Arg Asn His Gly Asp Phe His Glu Asn Cys
100 105 110

00769787 043604
T09370 28259250

234

11 Asn Thr Ile Gly Lys Asp Leu Val Asn Leu Leu Asp Pro Arg Tyr
115 120 125

Leu Glu Val Trp Gly Lys Phe Thr Pro Arg Gly Gly Ile Ser Ile Asp
130 135 140

Pro Tyr Tyr Asn Tyr Gly Lys Gln Gly Thr Lys Tyr Glu Gly Leu Ala
145 150 155 160

Glu Gln Arg Leu Phe Gln His Asp Leu Tyr Pro Glu Lys Ile Asp Asn
165 170 175

Arg

<210> 109

<211> 1236

<212> PRT

<213> Streptococcus pneumoniae

<400> 109

Met Thr Glu Thr Val Glu Asp Lys Val Ser His Ser Ile Thr Gly Leu
1 5 10 15

Asp Ile Leu Lys Gly Ile Val Ala Ala Gly Ala Val Ile Ser Gly Thr
20 25 30

Val Ala Thr Gln Thr Lys Val Phe Thr Asn Glu Ser Ala Val Leu Glu
35 40 45

Lys Thr Val Glu Lys Thr Asp Ala Leu Ala Thr Asn Asp Thr Val Val
50 55 60

Leu Gly Thr Ile Ser Thr Ser Asn Ser Ala Ser Ser Thr Ser Leu Ser
65 70 75 80

00759787-043604
T09270-28269260

235

Ala Ser Glu Ser Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser Thr Ser
85 90 95

Ala Ser Thr Ser Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser Thr Ser
100 105 110

Ala Ser Thr Ser Ile Ser Ala Ser Ser Thr Val Val Gly Ser Gln Thr
115 120 125

Ala Ala Ala Thr Glu Ala Thr Ala Lys Lys Val Glu Glu Asp Arg Lys
130 135 140

Lys Pro Ala Ser Asp Tyr Val Ala Ser Val Thr Asn Val Asn Leu Gln
145 150 155 160

Ser Tyr Ala Lys Arg Arg Lys Arg Ser Val Asp Ser Ile Glu Gln Leu
165 170 175

Leu Ala Ser Ile Lys Asn Ala Ala Val Phe Ser Gly Asn Thr Ile Val
180 185 190

Asn Gly Ala Pro Ala Ile Asn Ala Ser Leu Asn Ile Ala Lys Ser Glu
195 200 205

Thr Lys Val Tyr Thr Gly Glu Gly Val Asp Ser Val Tyr Arg Val Pro
210 215 220

Ile Tyr Tyr Lys Leu Lys Val Thr Asn Asp Gly Ser Lys Leu Thr Phe
225 230 235 240

Thr Tyr Thr Val Thr Tyr Val Asn Pro Lys Thr Asn Asp Leu Gly Asn
245 250 255

Ile Ser Ser Met Arg Pro Gly Tyr Ser Ile Tyr Asn Ser Gly Thr Ser
260 265 270

Thr Gln Thr Met Leu Thr Leu Gly Ser Asp Leu Gly Lys Pro Ser Gly
275 280 285

00759787-043604

236

Val Lys Asn Tyr Ile Thr Asp Lys Asn Gly Arg Gln Val Leu Ser Tyr
290 295 300

Asn Thr Ser Thr Met Thr Thr Gln Gly Ser Gly Tyr Thr Trp Gly Asn
305 310 315 320

Gly Ala Gln Met Asn Gly Phe Phe Ala Lys Lys Gly Tyr Gly Leu Thr
325 330 335

Ser Ser Trp Thr Val Pro Ile Thr Gly Thr Asp Thr Ser Phe Thr Phe
340 345 350

Thr Pro Tyr Ala Ala Arg Thr Asp Arg Ile Gly Ile Asn Tyr Phe Asn
355 360 365

Gly Gly Gly Lys Val Val Glu Ser Ser Thr Thr Ser Gln Ser Leu Ser
370 375 380

Gln Ser Lys Ser Leu Ser Val Ser Ala Ser Gln Ser Ala Ser Ala Ser
385 390 395 400

Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser
405 410 415

Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Val Ser
420 425 430

Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser
435 440 445

Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser Thr Ser Ala Ser Ala Ser
450 455 460

Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser
465 470 475 480

Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser Thr Ser Ala Ser Ala Ser
485 490 495

00969767 01360

237

Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser Thr Ser Ala Ser Ala Ser
500 505 510

Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Gly Ser
515 520 525

Ala Ser Thr Ser Thr Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser
530 535 540

Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser Ile Ser Ala Ser Glu Ser
545 550 555 560

Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser Thr Ser Thr Ser Ala Ser
565 570 575

Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser Thr Ser Ala Ser Ala Ser
580 585 590

Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser
595 600 605

Ala Ser Thr Ser Ala Ser Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser
610 615 620

Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser
625 630 635 640

Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser
645 650 655

Thr Ser Ala Ser Val Ser Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser
660 665 670

Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser
675 680 685

Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser
690 695 700

00760707 043604

238

Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser
705 710 715 720

Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser
725 730 735

Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser
740 745 750

Thr Ser Ala Ser Gly Ser Ala Ser Thr Ser Thr Ser Ala Ser Ala Ser
755 760 765

Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser
770 775 780

Ile Ser Ala Ser Glu Ser Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser
785 790 795 800

Thr Ser Thr Ser Ala Ser Ala Ser Thr Ser Ala Ser Glu Ser Ala Ser
805 810 815

Thr Ser Ala Ser Ala Ser Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser
820 825 830

Thr Ser Ala Ser Ala Ser Ala Arg Gln Val Arg Arg Pro Gln Pro Val
835 840 845

His Leu Asn Arg His Gln Pro Val Arg Gln Pro Gln Gln Val Leu Val
850 855 860

His Gln Leu Gln His Gln Arg Val His Arg Leu Gln His Gln Pro Val
865 870 875 880

Pro Arg Leu Gln Arg Gln Pro Val Arg Gln Leu Gln Gln Val Pro Val
885 890 895

Leu Gln Ser Gln His Gln Gln Val Leu Gln Pro Gln His Arg Gln Val
900 905 910

00926707 042604

Pro Arg Leu Gln Gln Ala His Gln His Leu Asn Gln Arg Arg Gln Ala
 915 920 925

Pro Gln Leu Gln Gln Val Pro Val Arg Gln Pro Gln Arg Arg Gln Val
 930 935 940

Arg Gln Pro Gln Gln Val Leu Val His Gln Leu Gln His Gln Arg Val
 945 950 955 960

His Arg Leu Arg Arg Gln Pro Val His Gln Ser Gln Gln Val Pro Val
 965 970 975

Arg Gln Leu Pro His Gln Gln Val Pro Arg Leu Gln Gln Ala Pro Val
 980 985 990

Arg Arg Leu Gln Gln Val Leu Ala Pro Gln Pro Gln Pro Gln Pro Val
 995 1000 1005

Arg Gln Pro Gln Gln Val Ser Gln Arg Leu Asn Arg His Gln Arg Val
 1010 1015 1020

Arg Pro Leu Gln Gln Val Leu Ala Pro Gln Pro Gln Arg Gln Gln Val
 1025 1030 1035 1040

His Arg Leu Gln Arg Gln Arg Val Arg Leu Asn Arg His Gln Arg Val
 1045 1050 1055

Arg Pro Leu Gln Gln Val Leu Ala Pro Gln Pro Gln Arg Gln Gln Val
 1060 1065 1070

His Arg Leu Gln His Gln Arg Val Arg Pro Leu Gln Gln Val Leu Ala
 1075 1080 1085

Pro Gln Pro Gln Arg Gln Gln Val His Arg Leu Gln Arg Gln Arg Val
 1090 1095 1100

Arg Leu Ser Gln His Gln Arg Val Arg Gln Pro Gln Gln Ala His Gln
 1105 1110 1115 1120

00760787-013601

240

Leu Leu Asn Leu His Gln Pro Val Arg Gln Pro Gln His Arg Gln Ala
1125 1130 1135

Pro Gln Leu Gln Gln Val Pro Val Arg Gln Pro Gln Arg Arg Gln Val
1140 1145 1150

Arg Arg Leu Gln Gln Val Pro Val Arg Gln Pro Gln Gln Val Pro Val
1155 1160 1165

Arg Gln Pro Gln Arg Arg Gln Val Arg Arg Pro Gln Pro Val His Leu
1170 1175 1180

Asn Arg His Gln Pro Val Arg Gln Pro Gln Gln Val Leu Val His Gln
1185 1190 1195 1200

Leu Gln His Gln Arg Val His Arg Leu Gln His Gln Pro Val His Gln
1205 1210 1215

Ser Gln Gln Val Pro Val Arg Gln Phe Arg Ile Asn Lys Cys Leu Gly
1220 1225 1230

Phe Ser Lys Tyr
1235

<210> 110

<211> 449

<212> PRT

<213> Streptococcus pneumoniae

<400> 110

Met Gly Val Glu Thr Trp Phe Tyr Ser Ser Ile Cys Trp Leu Ala Ile
1 5 10 15

Gly Leu Gly Ser Val Trp Lys Phe Pro Tyr Met Thr Ala Ala Asn Gly
20 25 30

Gly Gly Gly Phe Leu Leu Ile Phe Leu Ile Ser Thr Ile Leu Ile Gly
35 40 45

00760707 043604

241

Phe Pro Leu Leu Leu Ala Glu Phe Ala Leu Gly Arg Ser Ala Gly Val
50 55 60

Ser Ala Ile Lys Thr Phe Gly Lys Leu Gly Lys Asn Asn Lys Tyr Asn
65 70 75 80

Phe Ile Gly Trp Ile Gly Ala Phe Ala Leu Phe Ile Leu Leu Ser Phe
85 90 95

Tyr Ser Val Ile Gly Gly Trp Ile Leu Val Tyr Leu Gly Ile Glu Phe
100 105 110

Gly Lys Leu Phe Gln Leu Gly Gly Thr Gly Asp Tyr Ala Gln Leu Phe
115 120 125

Thr Ser Ile Ile Ser Asn Pro Ala Ile Ala Leu Gly Ala Gln Ala Ala
130 135 140

Phe Ile Leu Leu Asn Ile Phe Ile Val Ser Arg Gly Val Gln Lys Gly
145 150 155 160

Ile Glu Arg Ala Ser Lys Val Met Met Pro Leu Leu Phe Ile Val Phe
165 170 175

Val Phe Ile Ile Gly Arg Ser Leu Ser Leu Pro Asn Ala Met Glu Gly
180 185 190

Val Leu Tyr Phe Leu Lys Pro Asp Phe Ser Lys Leu Thr Ser Thr Gly
195 200 205

Leu Leu Tyr Ala Leu Gly Gln Ser Phe Phe Ala Leu Ser Leu Gly Val
210 215 220

Thr Val Met Leu Thr Tyr Ala Ser Tyr Leu Asp Lys Lys Thr Asn Leu
225 230 235 240

Val Gln Ser Gly Ile Ser Ile Val Ala Met Asn Ile Ser Ile Ser Ile
245 250 255

00769707 043604

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 10

Glu

<210> 111

<211> 186

<212> PRT

<213> Streptococcus pneumoniae

<400> 111

Met Leu Lys Lys Trp Gln Leu Lys Asp Val Ile Leu Leu Ala Phe Leu

1

5

10

15

Ser Ile Phe Phe Gly Gly Val Phe Val Gly Ser Gly Tyr Val Tyr Asn

20

25

30

Ile Leu Ser Leu Leu Leu Thr Pro Leu Gly Leu Gln Ala Phe Ala Asn

35

40

45

Glu Ile Leu Phe Gly Leu Trp Cys Met Ala Ala Pro Ile Ala Ala Ile

50

55

60

Phe Val Pro Arg Val Gly Ser Ala Thr Ile Gly Glu Val Leu Ala Ala

65

70

75

80

Leu Ala Glu Val Leu Tyr Gly Ser Gln Phe Gly Leu Gly Ala Leu Leu

85

90

95

Ser Gly Phe Val Gln Gly Leu Gly Ser Glu Phe Gly Phe Ile Val Thr

100

105

110

Lys Asn Arg Tyr Glu Ser Trp Leu Ser Leu Thr Ala Asn Ser Ile Gly

115

120

125

Ile Thr Leu Val Ser Phe Val Tyr Glu Tyr Ile Lys Leu Gly Tyr Tyr

130

135

140

Ala Phe Ser Leu Pro Phe Val Leu Ser Leu Leu Val Val Arg Phe Ile

145

150

155

160

Ser Val Tyr Phe Phe Cys Thr Ile Leu Val Arg Ala Ile Val Lys Leu

165

170

175

00760707 04604

Tyr His Gln Phe Ala Thr Gly Gly Lys Ala
 180 185

<210> 112

<211> 216

<212> PRT

<213> Streptococcus pneumoniae

<400> 112

Met Val Lys Val Ala Thr Gln Thr Pro Ile Ile Ser Leu Phe Leu Leu
 1 5 10 15

Ile Leu Ser Leu Glu Thr Ser Phe Ile Pro Ser Ile Ala Leu Thr Leu
 20 25 30

Ser Val Val Ala Phe Cys Ile Leu Phe Met Leu Tyr Tyr Arg Arg Phe
 35 40 45

Lys Met Leu Ala Trp Met Ile Ile Leu Ala Ile Leu Pro Ser Phe Ala
 50 55 60

Asn Tyr Trp Ala Val Gln Leu His Gly Asp Ala Ser Gln Ala Val Met
 65 70 75 80

Leu Gly Thr Arg Ala Phe Val Thr Val Cys Ile Gly Leu Val Phe Val
 85 90 95

Ser Ser Val Ser Leu Lys Glu Leu Leu Leu Tyr Leu Ala Gln Lys Gly
 100 105 110

Leu Ser Arg Ser Trp Ser Tyr Ala Leu Ile Val Val Phe Asn Ser Phe
 115 120 125

Pro Leu Ile Gln Gln Glu Ile Lys Ser Leu Lys Glu Ala Cys Leu Leu
 130 135 140

00760707 043604

245

Arg Gly Gln Glu Leu His Phe Trp Ser Pro Leu Ile Tyr Ser Lys Val
145 150 155 160

Leu Met Thr Val Phe Arg Trp Arg His Leu Tyr Leu Arg Ala Leu Ser
165 170 175

Ala His Gly Tyr Asp Glu His Ala Gln Leu Lys Asn Ser Tyr Arg Thr
180 185 190

Phe Tyr Ile Pro Lys Lys Thr Lys Leu Ile Tyr Leu Leu Phe Phe Leu
195 200 205

Leu Leu Gln Thr Ser Leu Phe Leu
210 215

<210> 113

<211> 174

<212> PRT

<213> Streptococcus pneumoniae

<400> 113

Met Arg Lys His Gln Leu Gln Val His Lys Leu Thr Ile Leu Ser Met
1 5 10 15

Met Ile Ala Leu Asp Val Val Leu Thr Pro Ile Phe Arg Ile Glu Gly
20 25 30

Met Ala Pro Met Ser Ser Val Val Asn Ile Leu Ala Gly Ile Met Met
35 40 45

Gly Pro Val Tyr Ala Leu Ala Met Ala Thr Val Thr Ala Phe Ile Arg
50 55 60

Met Thr Thr Gln Gly Ile Pro Pro Leu Ala Leu Thr Gly Ala Thr Phe
65 70 75 80

00769787.012501

246

Gly Ala Leu Leu Ala Gly Leu Phe Tyr Lys Tyr Gly Arg Lys Phe His
85 90 95

Tyr Ser Ala Leu Gly Glu Ile Leu Gly Thr Gly Ile Ile Gly Ser Ile
100 105 110

Val Ser Tyr Pro Val Met Val Leu Phe Thr Gly Ser Ala Ala Lys Leu
115 120 125

Ser Trp Phe Ile Tyr Thr Pro Arg Phe Phe Gly Ala Thr Leu Ile Gly
130 135 140

Thr Ala Ile Ser Phe Ile Ala Phe Arg Phe Leu Ile Lys Gln Glu Phe
145 150 155 160

Phe Lys Lys Val Gln Gly Tyr Phe Phe Ser Glu Arg Ile Asp
165 170

<210> 114

<211> 267

<212> PRT

<213> Streptococcus pneumoniae

<400> 114

Met Gln Glu Phe Thr Asn Pro Phe Pro Ile Gly Ser Ser Ser Leu Ile
1 5 10 15

His Cys Ile Thr Asn Glu Ile Ser Cys Glu Met Leu Ala Asn Gly Ile
20 25 30

Leu Ala Leu Gly Cys Lys Pro Val Met Ala Asp Asp Ser Arg Glu Val
35 40 45

Leu Asp Ph Thr Lys Gln Ser Gln Ala Leu Phe Ile Asn Leu Gly His
50 55 60

009697010460

247

Leu Ser Ala Glu Lys Glu Lys Ala Ile Arg Met Ala Ala Ser Tyr Ala
65 70 75 80

Asn Gln Ser Ser Leu Pro Met Val Val Asp Ala Val Gly Val Thr Thr
85 90 95

Ser Ser Ile Arg Lys Ser Leu Val Lys Asp Leu Leu Asp Tyr Arg Pro
100 105 110

Thr Val Leu Lys Gly Asn Met Ser Glu Ile Arg Ser Leu Val Gly Leu
115 120 125

Lys His His Gly Val Gly Val Asp Ala Ser Ala Lys Asp Gln Glu Thr
130 135 140

Glu Asp Leu Leu Gln Val Leu Lys Asp Trp Cys Gln Thr Tyr Pro Gly
145 150 155 160

Met Ser Phe Leu Val Thr Gly Pro Lys Asp Leu Val Val Ser Lys Asn
165 170 175

Gln Val Ala Val Leu Gly Asn Gly Cys Thr Glu Leu Asp Trp Ile Thr
180 185 190

Gly Thr Gly Asp Leu Val Gly Ala Leu Thr Ala Val Phe Leu Ser Gln
195 200 205

Gly Lys Thr Gly Phe Glu Ala Ser Cys Leu Ala Val Ser Tyr Leu Asn
210 215 220

Ile Ala Ala Glu Lys Ile Val Val Gln Gly Met Gly Leu Glu Glu Phe
225 230 235 240

Arg Tyr Gln Val Leu Asn Gln Leu Ser Leu Leu Arg Arg Asp Glu Asn
245 250 255

Trp Leu Asp Thr Ile Lys Gly Glu Val Tyr Glu
260 265

00760707 013504

<210> 115

<211> 277

<212> PRT

<213> Streptococcus pneumoniae

<400> 115

Met Asn His Lys Ile Ala Ile Leu Ser Asp Val His Gly Asn Ala Thr
 1 5 10 15

Ala Leu Glu Ala Val Ile Ala Asp Ala Lys Asn Gln Gly Ala Ser Glu
 20 25 30

Tyr Trp Leu Leu Gly Asp Ile Phe Leu Pro Gly Pro Gly Ala Asn Asp
 35 40 45

Leu Val Ala Leu Leu Lys Asp Leu Pro Ile Thr Ala Ser Val Arg Gly
 50 55 60

Asn Trp Asp Asp Arg Val Leu Glu Ala Leu Asp Gly Gln Tyr Gly Leu
 65 70 75 80

Glu Asp Pro Gln Glu Val Gln Leu Leu Arg Met Thr Gln Tyr Leu Met
 85 90 95

Glu Arg Met Asp Pro Ala Thr Ile Val Trp Leu Arg Ser Leu Pro Leu
 100 105 110

Leu Glu Lys Lys Glu Ile Asp Gly Leu Arg Phe Ser Ile Ser His Asn
 115 120 125

Leu Pro Asp Lys Asn Tyr Gly Gly Asp Leu Leu Val Glu Asn Asp Thr
 130 135 140

Glu Lys Phe Asp Gln Leu Leu Asp Ala Glu Thr Asp Val Ala Val Tyr
 145 150 155 160

09160707 042604
 109270 20269260

249

Gly His Val His Lys Gln Leu Leu Arg Tyr Gly Ser Gln Gly Gln Gln
165 170 175

Ile Ile Asn Pro Gly Ser Ile Gly Met Pro Tyr Phe Asn Trp Glu Ala
180 185 190

Leu Lys Asn His Arg Ser Gln Tyr Ala Val Ile Glu Val Glu Asp Gly
195 200 205

Glu Leu Leu Asn Ile Gln Phe Arg Lys Val Ala Tyr Asp Tyr Glu Ala
210 215 220

Glu Leu Glu Leu Ala Lys Ser Lys Gly Leu Pro Phe Ile Glu Met Tyr
225 230 235 240

Glu Glu Leu Arg Arg Asp Asp Asn Tyr Gln Gly His Asn Leu Glu Leu
245 250 255

Leu Ala Ser Leu Ile Glu Lys His Gly Tyr Val Glu Asp Val Lys Asn
260 265 270

Phe Phe Asp Phe Leu
275

<210> 116

<211> 241

<212> PRT

<213> Streptococcus pneumoniae

<400> 116

Met Asn Val Asn Gln Ile Val Arg Ile Ile Pro Thr Leu Lys Ala Asn
1 5 10 15

Asn Arg Lys Leu Asn Glu Thr Phe Tyr Ile Glu Thr Leu Gly Met Lys
20 25 30

Ala Leu Leu Glu Glu Ser Ala Phe Leu Ser Leu Gly Asp Gln Thr Gly
35 40 45

00759787 012604

250

Leu Glu Lys Leu Val Leu Glu Glu Ala Pro Ser Met Arg Thr Arg Lys
50 55 60

Val Glu Gly Arg Lys Lys Leu Ala Arg Leu Ile Val Lys Val Glu Asn
65 70 75 80

Pro Leu Glu Ile Glu Gly Ile Leu Ser Lys Thr Asp Ser Ile His Arg
85 90 95

Leu Tyr Lys Gly Gln Asn Gly Tyr Ala Phe Glu Ile Phe Ser Pro Glu
100 105 110

Asp Asp Leu Ile Leu Ile His Ala Glu Asp Asp Ile Ala Ser Leu Val
115 120 125

Glu Val Gly Glu Lys Pro Glu Phe Gln Thr Asp Leu Ala Ser Ile Ser
130 135 140

Leu Ser Lys Phe Glu Ile Ser Met Glu Leu His Leu Pro Thr Asp Ile
145 150 155 160

Glu Ser Phe Leu Glu Ser Ser Glu Ile Gly Ala Ser Leu Asp Phe Ile
165 170 175

Pro Ala Gln Gly Gln Asp Leu Thr Val Asp Asn Thr Val Thr Trp Asp
180 185 190

Leu Ser Met Leu Lys Phe Leu Val Asn Glu Leu Asp Ile Ala Ser Leu
195 200 205

Arg Gln Lys Phe Glu Ser Thr Glu Tyr Phe Ile Pro Lys Ser Glu Lys
210 215 220

Phe Phe Leu Gly Lys Asp Arg Asn Asn Val Glu Leu Trp Phe Glu Glu
225 230 235 240

Val

00169707-013604

<210> 117

<211> 311

<212> PRT

<213> Streptococcus pneumoniae

<400> 117

Met Lys Trp Thr Lys Ile Ile Lys Lys Ile Glu Glu Gln Ile Glu Ala

1 5 10 15

Gly Ile Tyr Pro Gly Ala Ser Phe Ala Tyr Phe Lys Asp Asn Gln Trp

20 25 30

Thr Glu Phe Tyr Leu Gly Gln Ser Asp Pro Glu His Gly Leu Gln Thr

35 40 45

Glu Ala Gly Leu Val Tyr Asp Leu Ala Ser Val Ser Lys Val Val Gly

50 55 60

Val Gly Thr Val Cys Thr Phe Leu Trp Glu Ile Gly Gln Leu Asp Ile

65 70 75 80

Asp Arg Leu Val Ile Asp Phe Leu Pro Glu Ser Asp Tyr Pro Asp Ile

85 90 95

Thr Ile Arg Gln Leu Leu Thr His Ala Thr Asp Leu Asp Pro Phe Ile

100 105 110

Pro Asn Arg Asp Leu Leu Thr Ala Pro Glu Leu Lys Glu Ala Met Phe

115 120 125

His Leu Asn Arg Arg Ser Gln Pro Ala Phe Leu Tyr Ser Asp Val His

130 135 140

Phe Leu Leu Leu Gly Phe Ile Leu Glu Arg Ile Phe Asn Gln Asp Leu

145 150 155 160

Asp Val Ile Leu Lys Asp Gln Val Trp Lys Pro Trp Gly Met Thr Glu

165 170 175

00160307 01501

252

Thr Lys Phe Gly Pro Val Glu Leu Ala Val Pro Thr Val Arg Gly Val
180 185 190

Glu Ala Gly Ile Val His Asp Pro Lys Ala Arg Leu Leu Gly Arg His
195 200 205

Ala Gly Ser Ala Gly Leu Phe Ser Thr Ile Lys Asp Leu Gln Ile Phe
210 215 220

Leu Glu His Tyr Leu Ala Asp Asp Phe Ala Arg Asp Leu Asn Gln Asn
225 230 235 240

Phe Ser Pro Leu Asp Asp Lys Glu Arg Ser Leu Ala Trp Asn Leu Glu
245 250 255

Gly Asp Trp Leu Asp His Thr Gly Tyr Thr Gly Thr Phe Ile Met Trp
260 265 270

Asn Arg Gln Lys Gln Glu Ala Thr Ile Phe Leu Ser Asn Arg Thr Tyr
275 280 285

Glu Lys Asp Glu Arg Ala Gln Trp Ile Leu Asp Arg Asn Gln Val Met
290 295 300

Asn Leu Ile Arg Lys Glu Glu
305 310

<210> 118

<211> 160

<212> PRT

<213> Streptococcus pneumoniae

<400> 118

Met Met Lys Lys Thr Tyr Asn His Ile Leu Val Trp Gly Val Ile Phe
1 5 10 15

253

Tyr Ser Ile Cys Ile Val Cys Phe Cys Phe Thr Pro Gln Glu Gln Ser
20 25 30

Thr Val Gly Val Gly Thr Pro Gly Ile Gln His Leu Gly Arg Leu Val
35 40 45

Phe Leu Leu Thr Pro Phe Asn Ser Leu Trp Lys Leu Gly Glu Val Ser
50 55 60

Asp Ile Gly Gln Leu Cys Trp Ile Phe Leu Gln Asn Ile Leu Asn Val
65 70 75 80

Phe Leu Phe Phe Pro Leu Ile Phe Gln Leu Leu Tyr Leu Phe Pro Asn
85 90 95

Leu Arg Lys Thr Lys Lys Val Leu Leu Phe Ser Phe Leu Val Ser Leu
100 105 110

Gly Ile Glu Cys Thr Gln Leu Ile Leu Asp Phe Phe Phe Asp Phe Asn
115 120 125

Arg Val Phe Glu Ile Asp Asp Leu Trp Thr Asn Thr Leu Gly Gly Tyr
130 135 140

Leu Ala Trp Leu Leu Tyr Lys Arg Leu His Lys Asn Lys Val Arg Asn
145 150 155 160

<210> 119

<211> 263

<212> PRT

<213> Streptococcus pneumoniae

<400> 119

Met Lys Ile Pro Leu Leu Thr Phe Ala Arg His Lys Phe Val Tyr Val
1 5 10 15

00260767 012504

Leu Leu Thr Leu Leu Phe Leu Ala Leu Val Tyr Arg Asp Val Leu Met
 20 25 30

Thr Tyr Phe Phe Phe Asp Ile His Ala Pro Asp Leu Ala Lys Phe Asp
 35 40 45

Gly Gln Ala Ile Lys Asn Asp Leu Leu Lys Ser Ala Leu Asp Phe Arg
 50 55 60

Ile Leu Gln Phe Asn Leu Gly Phe Tyr Gln Ser Phe Ile Ile Pro Ile
 65 70 75 80

Ile Ile Val Leu Leu Gly Phe Gln Tyr Ile Glu Leu Lys Asn Lys Val
 85 90 95

Leu Arg Leu Ser Ile Gly Arg Glu Val Ser Tyr Gln Gly Leu Lys Arg
 100 105 110

Lys Leu Thr Leu Gln Val Ala Ser Ile Pro Cys Leu Ile Tyr Leu Val
 115 120 125

Thr Val Leu Ile Ile Ala Ile Ile Thr Tyr Phe Phe Gly Thr Phe Ser
 130 135 140

Pro Leu Gly Trp Asn Ser Leu Phe Ser Asp Gly Ser Gly Leu Gln Arg
 145 150 155 160

Leu Leu Asp Gly Glu Ile Lys Ser Tyr Leu Phe Phe Thr Cys Val Leu
 165 170 175

Leu Ile Gly Ile Phe Ile Asn Ala Ile Tyr Phe Leu Gln Ile Val Asp
 180 185 190

Tyr Val Gly Asn Val Thr Arg Ser Ala Ile Thr Tyr Leu Met Phe Leu
 195 200 205

Trp Leu Gly Ser Met Leu Leu Tyr Ser Ala Leu Pro Tyr Tyr Met Val
 210 215 220

00760707 012501

256

Gly Ser Ala Ile Asp Thr Gly Val Ile Gly Ala Leu Val Val Gly Ile
115 120 125

Val Ala Val Tyr Leu His Asn Arg Tyr Asn Asn Ile Gln Leu Pro Ser
130 135 140

Ala Leu Gly Phe Phe Gly Gly Ser Arg Phe Val Pro Ile Val Thr Ser
145 150 155 160

Phe Ser Ser Ile Leu Ile Gly Phe Val Phe Phe Val Ile Trp Pro Pro
165 170 175

Phe Gln Gln Leu Leu Val Ser Thr Gly Gly Tyr Ile Ser Gln Ala Gly
180 185 190

Pro Ile Gly Thr Phe Leu Tyr Gly Phe Leu Met Arg Leu Ser Gly Ala
195 200 205

Val Gly Leu His His Ile Ile Tyr Pro Met Phe Trp Tyr Thr Glu Leu
210 215 220

Gly Gly Val Glu Thr Val Ala Gly Gln Thr Val Val Gly Ala Gln Lys
225 230 235 240

Ile Phe Phe Ala Gln Leu Ala Asp Leu Ala His Ser Gly Leu Phe Thr
245 250 255

Glu Gly Thr Arg Phe Phe Ala Gly Arg Phe Ser Thr Met Met Phe Gly
260 265 270

Leu Pro Ala Ala Cys Leu Ala Met Tyr His Ser Val Pro Lys Asn Arg
275 280 285

Arg Lys Lys Tyr Ala Gly Leu Phe Phe Gly Val Ala Leu Thr Ser Phe
290 295 300

Ile Thr Gly Ile Thr Glu Pro Ile Glu Phe Met Phe Leu Phe Val Ser
305 310 315 320

0050709 01504

257

Pro Val Leu Tyr Val Val His Ala Phe Leu Asp Gly Val Ser Phe Phe
325 330 335

Ile Ala Asp Val Leu Asn Ile Ser Ile Gly Asn Thr Phe Ser Gly Gly
340 345 350

Val Ile Asp Phe Thr Leu Phe Gly Ile Leu Gln Gly Asn Ala Lys Thr
355 360 365

Asn Trp Val Leu Gln Ile Pro Phe Gly Leu Ile Trp Ser Val Leu Tyr
370 375 380

Tyr Ile Ile Phe Arg Trp Phe Ile Thr Gln Phe Asn Val Leu Thr Pro
385 390 395 400

Gly Arg Gly Glu Glu Val Asp Ser Lys Glu Ile Ser Glu Ser Ala Asp
405 410 415

Ser Thr Ser Asn Thr Ala Asp Tyr Leu Lys Gln Asp Ser Leu Gln Ile
420 425 430

Ile Arg Ala Leu Gly Gly Ser Asn Asn Ile Glu Asp Val Asp Ala Cys
435 440 445

Val Thr Arg Leu Arg Val Ala Val Lys Glu Val Asn Gln Val Asp Lys
450 455 460

Ala Leu Leu Lys Gln Ile Gly Ala Val Asp Val Leu Glu Val Lys Gly
465 470 475 480

Gly Ile Gln Ala Ile Tyr Gly Ala Lys Ala Ile Leu Tyr Lys Asn Ser
485 490 495

Ile Asn Glu Ile Leu Gly Val Asp Asp
500 505

00769787 013601

<210> 121

<211> 442

<212> PRT

<213> Streptococcus pneumoniae

<400> 121

Met Lys Phe Arg Lys Leu Ala Cys Thr Val Leu Ala Gly Ala Ala Val

1 5 10 15

Leu Gly Leu Ala Ala Cys Gly Asn Ser Gly Gly Ser Lys Asp Ala Ala

20 25 30

Lys Ser Gly Gly Asp Gly Ala Lys Thr Glu Ile Thr Trp Trp Ala Phe

35 40 45

Pro Val Phe Thr Gln Glu Lys Thr Gly Asp Gly Val Gly Thr Tyr Glu

50 55 60

Lys Ser Ile Ile Glu Ala Phe Glu Lys Ala Asn Pro Asp Ile Lys Val

65 70 75 80

Lys Leu Glu Thr Ile Asp Phe Lys Ser Gly Pro Glu Lys Ile Thr Thr

85 90 95

Ala Ile Glu Ala Gly Thr Ala Pro Asp Val Leu Phe Asp Ala Pro Gly

100 105 110

Arg Ile Ile Gln Tyr Gly Lys Asn Gly Lys Leu Ala Glu Leu Asn Asp

115 120 125

Leu Phe Thr Asp Glu Phe Val Lys Asp Val Asn Asn Glu Asn Ile Val

130 135 140

Gln Ala Ser Lys Ala Gly Asp Lys Ala Tyr Met Tyr Pro Ile Ser Ser

145 150 155 160

Ala Pro Phe Tyr Met Ala Met Asn Lys Lys Met Leu Glu Asp Ala Gly

165 170 175

00760787 013501

259

Val Ala Asn Leu Val Lys Glu Gly Trp Thr Thr Asp Asp Phe Glu Lys
180 185 190

Val Leu Lys Ala Leu Lys Asp Lys Gly Tyr Thr Pro Gly Ser Leu Phe
195 200 205

Ser Ser Gly Gln Gly Gly Asp Gln Gly Thr Arg Ala Phe Ile Ser Asn
210 215 220

Leu Tyr Ser Gly Ser Val Thr Asp Glu Lys Val Ser Lys Tyr Thr Thr
225 230 235 240

Asp Asp Pro Lys Phe Val Lys Gly Leu Glu Lys Ala Thr Ser Trp Ile
245 250 255

Lys Asp Asn Leu Ile Asn Asn Gly Ser Gln Phe Asp Gly Gly Ala Asp
260 265 270

Ile Gln Asn Phe Ala Asn Gly Gln Thr Ser Tyr Thr Ile Leu Trp Ala
275 280 285

Pro Ala Gln Asn Gly Ile Gln Ala Lys Leu Leu Glu Ala Ser Lys Val
290 295 300

Glu Val Val Glu Val Pro Phe Pro Ser Asp Glu Gly Lys Pro Ala Leu
305 310 315 320

Glu Tyr Leu Val Asn Gly Phe Ala Val Phe Asn Asn Lys Asp Asp Lys
325 330 335

Lys Val Ala Ala Ser Lys Lys Phe Ile Gln Phe Ile Ala Asp Asp Lys
340 345 350

Glu Trp Gly Pro Lys Asp Val Val Arg Thr Gly Ala Phe Pro Val Arg
355 360 365

Thr Ser Phe Gly Lys Leu Tyr Glu Asp Lys Arg Met Glu Thr Ile Ser
370 375 380

00759787 01564
109210 1825260

260

Gly Trp Thr Gln Tyr Tyr Ser Pro Tyr Tyr Asn Thr Ile Asp Gly Phe
385 390 395 400

Ala Glu Met Arg Thr Leu Trp Phe Pro Met Leu Gln Ser Val Ser Asn
405 410 415

Gly Asp Glu Lys Pro Ala Asp Ala Leu Lys Ala Phe Thr Glu Lys Ala
420 425 430

Asn Glu Thr Ile Lys Lys Ala Met Lys Gln
435 440

<210> 122

<211> 279

<212> PRT

<213> Streptococcus pneumoniae

<400> 122

Met Gln Ser Thr Glu Lys Lys Pro Leu Thr Ala Phe Thr Val Ile Ser
1 5 10 15

Thr Ile Ile Leu Leu Leu Leu Thr Val Leu Phe Ile Phe Pro Phe Tyr
20 25 30

Trp Ile Leu Thr Gly Ala Phe Lys Ser Gln Pro Asp Thr Ile Val Ile
35 40 45

Pro Pro Gln Trp Phe Pro Lys Met Pro Thr Met Glu Asn Phe Gln Gln
50 55 60

Leu Met Val Gln Asn Pro Ala Leu Gln Trp Met Trp Asn Ser Val Phe
65 70 75 80

Ile Ser Leu Val Thr Met Phe Leu Val Cys Ala Thr Ser Ser Leu Ala
85 90 95

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[illegible]

Thr Met Gly Ala Val Lys Gly
275

<210> 123

<211> 216

<212> PRT

<213> Streptococcus pneumoniae

<400> 123

Met Lys Ile Met Phe Lys Asn Phe Asn Asn Ile Leu Leu Asn Arg Lys

1

5

10

15

Ile Val Leu Leu Leu Arg Ile Val Leu Met Met Ile Leu Ile Asn His

20

25

30

Leu Leu Ser Thr Ala Val Gln Lys Gln Asp Ala Val Ile Phe Phe Lys

35

40

45

Arg Glu Leu Ile Ser Ile Phe Ser Tyr Asn Asp Tyr Ser Glu Ala Asn

50

55

60

Leu Glu Ile Pro Lys Leu Leu Leu Asn Leu Ser Leu Phe Met Val Gly

65

70

75

80

Trp Leu Ser Val Ile Leu Leu Glu Ser Asp Leu Ala Asp His Tyr His

85

90

95

His Leu Ile Arg Tyr Gln Ser Ser Ser Phe Phe Asp Tyr Thr Arg Lys

100

105

110

Arg Leu Val Val Ile Ser Lys Phe Phe Thr Gln Asp Leu Phe Val Trp

115

120

125

Phe Leu Gly Leu Leu Pro Leu Gly Ile His Phe Lys Thr Val Ala Leu

130

135

140

Phe Phe Leu Leu Ala Gln L u Met Met Leu Tyr Leu Leu Leu Ser Tyr

145

150

155

160

L u Ile Ala Leu Ile Ser Ala Gly Ala Gly Phe Ser Phe Phe Leu Tyr

165

170

175

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[illegible]

Val Tyr Leu Val Leu Leu Ser Leu Leu Val Met Leu Ile Val Ser Arg
195 200 205

<210> 124

<212> PRT

<213> Streptococcus pneumoniae

<400> 124

Ser Glu Val Leu Val Asn Lys Ala Pro Thr Leu Gln Leu Ala Asn Gly
20 25 30

Ala Val Asp Lys Glu Asp Ile Gly Gln Glu Ile Ile Gly Ile Ala Lys
50 55 60

Gly Ser Ile Glu Ser Met His Asn Leu Pro Val Asn Leu Ala Gly Ala
65 70 75 80

Arg Val Pro Gly Gly Val Asn Gly Ser Lys Ala Ala Val His Glu Val
85 90 95

Pro Glu Phe Thr Gly Gly Val Asn Gly Thr Glu Pro Ala Val His Glu
100 105 110

264

Ile Ala Glu Tyr Lys Gly Ser Asp Ser Leu Val Thr Leu Thr Thr Lys
115 120 125

Lys Asp Tyr Thr Tyr Lys Ala Pro Leu Ala Gln Gln Ala Leu Pro Glu
130 135 140

Thr Gly Asn Lys Glu Ser Asp Leu Leu Ala Ser Leu Gly Leu Thr Ala
145 150 155 160

Phe Phe Leu Gly Leu Phe Thr Leu Gly Lys Lys Arg Glu Gln
165 170

<210> 125

<211> 629

<212> PRT

<213> Streptococcus pneumoniae

<400> 125

Met Lys Lys Thr Phe Phe Leu Leu Val Leu Gly Leu Phe Cys Leu Leu
1 5 10 15

Pro Leu Ser Val Phe Ala Ile Asp Phe Lys Ile Asn Ser Tyr Gln Gly
20 25 30

Asp Leu Tyr Ile His Ala Asp Asn Thr Ala Glu Phe Arg Gln Lys Ile
35 40 45

Val Tyr Gln Phe Glu Glu Asp Phe Lys Gly Gln Ile Val Gly Leu Gly
50 55 60

Arg Ala Gly Lys Met Pro Ser Gly Phe Asp Ile Asp Pro His Pro Lys
65 70 75 80

Ile Gln Ala Ala Lys Asn Gly Ala Glu Leu Ala Asp Val Thr Ser Glu
85 90 95

109270 28259260

265

Val Thr Glu Glu Ala Asp Gly Tyr Thr Val Arg Val Tyr Asn Pro Gly
100 105 110

Gln Glu Gly Asp Ile Val Glu Val Asp Leu Val Trp Asn Leu Lys Asn
115 120 125

Leu Leu Phe Leu Tyr Asp Asp Ile Ala Glu Leu Asn Trp Gln Pro Leu
130 135 140

Thr Asp Ser Ser Glu Ser Ile Glu Lys Phe Glu Phe His Val Arg Gly
145 150 155 160

Asp Lys Gly Ala Glu Lys Leu Phe Phe His Thr Gly Lys Leu Phe Arg
165 170 175

Glu Gly Thr Ile Glu Lys Ser Asn Leu Asp Tyr Thr Ile Arg Leu Asp
180 185 190

Asn Leu Pro Ala Lys Arg Gly Val Glu Leu His Ala Tyr Trp Pro Arg
195 200 205

Thr Asp Phe Ala Ser Ala Arg Asp Gln Gly Leu Lys Gly Asn Arg Leu
210 215 220

Glu Glu Phe Asn Lys Ile Glu Asp Ser Ile Val Arg Glu Lys Asp Gln
225 230 235 240

Ser Lys Gln Leu Val Thr Trp Val Leu Pro Ser Ile Leu Ser Ile Ser
245 250 255

Leu Leu Leu Ser Val Cys Phe Tyr Phe Ile Tyr Arg Arg Lys Thr Thr
260 265 270

Pro Ser Val Lys Tyr Ala Lys Asn His Arg Leu Tyr Glu Pro Pro Met
275 280 285

Glu Leu Glu Pro Met Val Leu Ser Glu Ala Val Tyr Ser Thr Ser Leu
290 295 300

00769787 012604

Arg Leu Asp Asn Arg Asp Gly Val Leu Asn Glu Ala Gly Ala Glu Val
500 505 510

267

Tyr Tyr Leu Trp Thr Ser Phe Glu Asn Met Leu Arg Glu Ile Ala Arg
515 520 525

Leu Asp Gln Ala Glu Leu Glu Ser Ile Val Val Trp Asn Arg Leu Leu
530 535 540

Val Tyr Ala Thr Leu Phe Gly Tyr Ala Asp Lys Val Ser His Leu Met
545 550 555 560

Lys Val His Gln Ile Gln Val Glu Asn Pro Asp Ile Asn Leu Tyr Val
565 570 575

Ala Tyr Gly Trp His Ser Thr Phe Tyr His Ser Thr Ala Gln Met Ser
580 585 590

His Tyr Ala Ser Val Ala Asn Thr Ala Ser Thr Tyr Ser Val Ser Ser
595 600 605

Gly Ser Gly Ser Ser Gly Gly Gly Phe Ser Gly Gly Gly Gly Gly Gly
610 615 620

Ser Ile Gly Ala Phe
625

<210> 126

<211> 886

<212> PRT

<213> Streptococcus pneumoniae

<400> 126

Met Lys Lys Val Arg Lys Ile Phe Gln Lys Ala Val Ala Gly Leu Cys
1 5 10 15

Cys Ile Ser Gln Leu Thr Ala Phe Ser Ser Ile Val Ala Leu Ala Glu
20 25 30

00760707 043501

Thr Pro Glu Thr Ser Pro Ala Ile Gly Lys Val Val Ile Lys Glu Thr
35 40 45

Gly Glu Gly Gly Ala Leu Leu Gly Asp Ala Val Phe Glu Leu Lys Asn
50 55 60

Asn Thr Asp Gly Thr Thr Val Ser Gln Arg Thr Glu Ala Gln Thr Gly
65 70 75 80

Glu Ala Ile Phe Ser Asn Ile Lys Pro Gly Thr Tyr Thr Leu Thr Glu
85 90 95

Ala Gln Pro Pro Val Gly Tyr Lys Pro Ser Thr Lys Gln Trp Thr Val
100 105 110

Glu Val Glu Lys Asn Gly Arg Thr Thr Val Gln Gly Glu Gln Val Glu
115 120 125

Asn Arg Glu Glu Ala Leu Ser Asp Gln Tyr Pro Gln Thr Gly Thr Tyr
130 135 140

Pro Asp Val Gln Thr Pro Tyr Gln Ile Ile Lys Val Asp Gly Ser Glu
145 150 155 160

Lys Asn Gly Gln His Lys Ala Leu Asn Pro Asn Pro Tyr Glu Arg Val
165 170 175

Ile Pro Glu Gly Thr Leu Ser Lys Arg Ile Tyr Gln Val Asn Asn Leu
180 185 190

Asp Asp Asn Gln Tyr Gly Ile Glu Leu Thr Val Ser Gly Lys Thr Val
195 200 205

Tyr Glu Gln Lys Asp Lys Ser Val Pro Leu Asp Val Val Ile Leu Leu
210 215 220

Asp Asn Ser Asn Ser M t Ser Asn Ile Arg Asn Lys Asn Ala Arg Arg
225 230 235 240

00569 01360
105610 28269260

269

Ala Glu Arg Ala Gly Glu Ala Thr Arg Ser Leu Ile Asp Lys Ile Thr
245 250 255

Ser Asp Ser Glu Asn Arg Val Ala Leu Val Thr Tyr Ala Ser Thr Ile
260 265 270

Phe Asp Gly Thr Glu Phe Thr Val Glu Lys Gly Val Ala Asp Lys Asn
275 280 285

Gly Lys Arg Leu Asn Asp Ser Leu Phe Trp Asn Tyr Asp Gln Thr Ser
290 295 300

Phe Thr Thr Asn Thr Lys Asp Tyr Ser Tyr Leu Lys Leu Thr Asn Asp
305 310 315 320

Lys Asn Asp Ile Val Glu Leu Lys Asn Lys Val Pro Thr Glu Ala Glu
325 330 335

Asp His Asp Gly Asn Arg Leu Met Tyr Gln Phe Gly Ala Thr Phe Thr
340 345 350

Gln Lys Ala Leu Met Lys Ala Asp Glu Ile Leu Thr Gln Gln Ala Arg
355 360 365

Gln Asn Ser Gln Lys Val Ile Phe His Ile Thr Asp Gly Val Pro Thr
370 375 380

Met Ser Tyr Pro Ile Asn Phe Asn His Ala Thr Phe Ala Pro Ser Tyr
385 390 395 400

Gln Asn Gln Leu Asn Ala Phe Phe Ser Lys Ser Pro Asn Lys Asp Gly
405 410 415

Ile Leu Leu Ser Asp Phe Ile Thr Gln Ala Thr Ser Gly Glu His Thr
420 425 430

Il Val Arg Gly Asp Gly Gln Ser Tyr Gln Met Phe Thr Asp Lys Thr
435 440 445

007607-01501

270

Val Tyr Glu Lys Gly Ala Pro Ala Ala Phe Pro Val Lys Pro Glu Lys
450 455 460

Tyr Ser Glu Met Lys Ala Ala Gly Tyr Ala Val Ile Gly Asp Pro Ile
465 470 475 480

Asn Gly Gly Tyr Ile Trp Leu Asn Trp Arg Glu Ser Ile Leu Ala Tyr
485 490 495

Pro Phe Asn Ser Asn Thr Ala Lys Ile Thr Asn His Gly Asp Pro Thr
500 505 510

Arg Trp Tyr Tyr Asn Gly Asn Ile Ala Pro Asp Gly Tyr Asp Val Phe
515 520 525

Thr Val Gly Ile Gly Ile Asn Gly Asp Pro Gly Thr Asp Glu Ala Thr
530 535 540

Ala Thr Ser Phe Met Gln Ser Ile Ser Ser Lys Pro Glu Asn Tyr Thr
545 550 555 560

Asn Val Thr Asp Thr Thr Lys Ile Leu Glu Gln Leu Asn Arg Tyr Phe
565 570 575

His Thr Ile Val Thr Glu Lys Lys Ser Ile Glu Asn Gly Thr Ile Thr
580 585 590

Asp Pro Met Gly Glu Leu Ile Asp Leu Gln Leu Gly Thr Asp Gly Arg
595 600 605

Phe Asp Pro Ala Asp Tyr Thr Leu Thr Ala Asn Asp Gly Ser Arg Leu
610 615 620

Glu Asn Gly Gln Ala Val Gly Gly Pro Gln Asn Asp Gly Gly Leu Leu
625 630 635 640

Lys Asn Ala Lys Val Leu Tyr Asp Thr Thr Glu Lys Arg Ile Arg Val
645 650 655

00769787 012601

271

Thr Gly Leu Tyr Leu Gly Thr Asp Glu Lys Val Thr Leu Thr Tyr Asn
660 665 670

Val Arg Leu Asn Asp Glu Phe Val Ser Asn Lys Phe Tyr Asp Thr Asn
675 680 685

Gly Arg Thr Thr Leu His Pro Lys Glu Val Glu Gln Asn Thr Val Arg
690 695 700

Asp Phe Pro Ile Pro Lys Ile Arg Asp Val Arg Lys Tyr Pro Glu Ile
705 710 715 720

Thr Ile Ser Lys Glu Lys Lys Leu Gly Asp Ile Glu Phe Ile Lys Val
725 730 735

Asn Lys Asn Asp Lys Lys Pro Leu Arg Gly Ala Val Phe Ser Leu Gln
740 745 750

Lys Gln His Pro Asp Tyr Pro Asp Ile Tyr Gly Ala Ile Asp Gln Asn
755 760 765

Gly Thr Tyr Gln Asn Val Arg Thr Gly Glu Asp Gly Lys Leu Thr Phe
770 775 780

Lys Asn Leu Ser Asp Gly Lys Tyr Arg Leu Phe Glu Asn Ser Glu Pro
785 790 795 800

Ala Gly Tyr Lys Pro Val Gln Asn Lys Pro Ile Val Ala Phe Gln Ile
805 810 815

Val Asn Gly Glu Val Arg Asp Val Thr Ser Ile Val Pro Gln Asp Ile
820 825 830

Pro Ala Gly Tyr Glu Phe Thr Asn Asp Lys His Tyr Ile Thr Asn Glu
835 840 845

Pro Ile Pro Pro Lys Arg Glu Tyr Pro Arg Thr Gly Gly Ile Gly Met
850 855 860

003697 04360

Leu Pro Phe Tyr Leu Ile Gly Cys Met Met Met Gly Gly Val Leu Leu
 865 870 875 880

Tyr Thr Arg Lys His Pro
 885

<210> 127

<211> 665

<212> PRT

<213> Streptococcus pneumoniae

<400> 127

Met Lys Ser Ile Asn Lys Phe Leu Thr Met Leu Ala Ala Leu Leu Leu
 1 5 10 15

Thr Ala Ser Ser Leu Phe Ser Ala Ala Thr Val Phe Ala Ala Gly Thr
 20 25 30

Thr Thr Thr Ser Val Thr Val His Lys Leu Leu Ala Thr Asp Gly Asp
 35 40 45

Met Asp Lys Ile Ala Asn Glu Leu Glu Thr Gly Asn Tyr Ala Gly Asn
 50 55 60

Lys Val Gly Val Leu Pro Ala Asn Ala Lys Glu Ile Ala Gly Val Met
 65 70 75 80

Phe Val Trp Thr Asn Thr Asn Asn Glu Ile Ile Asp Glu Asn Gly Gln
 85 90 95

Thr Leu Gly Val Asn Ile Asp Pro Gln Thr Phe Lys Leu Ser Gly Ala
 100 105 110

Met Pro Ala Thr Ala Met Lys Lys Leu Thr Glu Ala Glu Gly Ala Lys
 115 120 125

00769787-043604

10300-264444

273
Phe Asn Thr Ala Asn Leu Pro Ala Ala Lys Tyr Lys Ile Tyr Glu Ile
130 135 140
His Ser Leu Ser Thr Tyr Val Gly Glu Asp Gly Ala Thr Leu Thr Gly
145 150 155 160
Ser Lys Ala Val Pro Ile Glu Ile Glu Leu Pro Leu Asn Asp Val Val
165 170 175
Asp Ala His Val Tyr Pro Lys Asn Thr Glu Ala Lys Pro Lys Ile Asp
180 185 190
Lys Asp Phe Lys Gly Lys Ala Asn Pro Asp Thr Pro Arg Val Asp Lys
195 200 205
Asp Thr Pro Val Asn His Gln Val Gly Asp Val Val Glu Tyr Glu Ile
210 215 220
Val Thr Lys Ile Pro Ala Leu Ala Asn Tyr Ala Thr Ala Asn Trp Ser
225 230 235 240
Asp Arg Met Thr Glu Gly Leu Ala Phe Asn Lys Gly Thr Val Lys Val
245 250 255
Thr Val Asp Asp Val Ala Leu Glu Ala Gly Asp Tyr Ala Leu Thr Glu
260 265 270
Val Ala Thr Gly Phe Asp Leu Lys Leu Thr Asp Ala Gly Leu Ala Lys
275 280 285
Val Asn Asp Gln Asn Ala Glu Lys Thr Val Lys Ile Thr Tyr Ser Ala
290 295 300
Thr Leu Asn Asp Lys Ala Ile Val Glu Val Pro Glu Ser Asn Asp Val
305 310 315 320
Thr Phe Asn Tyr Gly Asn Asn Pro Asp His Gly Asn Thr Pro Lys Pro
325 330 335

Case 1

Ala Tyr Asn Ala Ala Val Ile Ala Ala Asn Asn Ala Phe Glu Trp Val
530 535 540

275

Ala Asp Lys Asp Asn Glu Asn Val Val Lys Leu Val Ser Asp Ala Gln
545 550 555 560

Gly Arg Phe Glu Ile Thr Gly Leu Leu Ala Gly Thr Tyr Tyr Leu Glu
565 570 575

Glu Thr Lys Gln Pro Ala Gly Tyr Ala Leu Leu Thr Ser Arg Gln Lys
580 585 590

Phe Glu Val Thr Ala Thr Ser Tyr Ser Ala Thr Gly Gln Gly Ile Glu
595 600 605

Tyr Thr Ala Gly Ser Gly Lys Asp Asp Ala Thr Lys Val Val Asn Lys
610 615 620

Lys Ile Thr Ile Pro Gln Thr Gly Gly Ile Gly Thr Ile Ile Phe Ala
625 630 635 640

Val Ala Gly Ala Ala Ile Met Gly Ile Ala Val Tyr Ala Tyr Val Lys
645 650 655

Asn Asn Lys Asp Glu Asp Gln Leu Ala
660 665

<210> 128

<211> 390

<212> PRT

<213> Streptococcus pneumoniae

<400> 128

Met Thr Met Gln Lys Met Gln Lys Met Ile Ser Arg Ile Phe Phe Val
1 5 10 15

Met Ala Leu Cys Phe Ser Leu Val Trp Gly Ala His Ala Val Gln Ala
20 25 30

003693 012501

Asn Tyr Arg Phe Lys Glu Val Glu Pro Leu Ala Gly Tyr Ala Val Thr
225 230 235 240

[illegible]

Cys His Phe Val Val Trp
385 390

<210> 129

<211> 521

<212> PRT

<213> Streptococcus pneumoniae

<400> 129

Met Ser His Ile Tyr Leu Ser Ile Phe Thr Ser Leu Leu Leu Met Leu

1

5

10

15

Gly Leu Val Asn Val Ala Gln Ala Asp Glu Tyr Leu Arg Ile Gly Met

20

25

30

Glu Ala Ala Tyr Ala Pro Phe Asn Trp Thr Gln Asp Asp Asp Ser Asn

35

40

45

Gly Ala Val Lys Ile Asp Gly Thr Asn Gln Tyr Ala Asn Gly Tyr Asp

50

55

60

Val Gln Ile Ala Lys Lys Ile Ala Lys Asp Leu Gly Lys Glu Pro Leu

65

70

75

80

Val Val Lys Thr Lys Trp Glu Gly Leu Val Pro Ala Leu Thr Ser Gly

85

90

95

Lys Ile Asp Met Ile Ile Ala Gly Met Ser Pro Thr Ala Glu Arg Lys

100

105

110

Gln Glu Ile Ala Phe Ser Ser Ser Tyr Tyr Thr Ser Glu Pro Val Leu

115

120

125

Leu Val Lys Lys Asp Ser Ala Tyr Ala Ser Ala Lys Ser Leu Asp Asp

130

135

140

Phe Asn Gly Ala Lys Ile Thr Ser Gln Gln Gly Val Tyr Leu Tyr Asn

145

150

155

160

Leu Ile Ala Gln Ile Pro Gly Ala Lys Lys Glu Thr Ala Met Gly Asp

165

170

175

007697.01360

279

Phe Ala Gln Met Arg Gln Ala Leu Glu Ala Gly Val Ile Asp Ala Tyr
180 185 190

Val Ser Glu Arg Pro Glu Ala Leu Thr Ala Glu Ala Ala Asn Ser Lys
195 200 205

Phe Lys Met Ile Gln Val Glu Pro Gly Phe Lys Thr Gly Glu Glu Asp
210 215 220

Thr Ala Ile Ala Ile Gly Leu Arg Lys Asn Asp Asn Arg Ile Ser Gln
225 230 235 240

Ile Asn Ala Ser Ile Glu Thr Ile Ser Lys Asp Asp Gln Val Ala Leu
245 250 255

Met Asp Arg Met Ile Lys Glu Gln Pro Ala Glu Ala Thr Thr Thr Glu
260 265 270

Glu Thr Ser Ser Ser Phe Phe Ser Gln Val Ala Lys Ile Leu Ser Glu
275 280 285

Asn Trp Gln Gln Leu Leu Arg Gly Ala Gly Ile Thr Leu Leu Ile Ser
290 295 300

Ile Val Gly Thr Ile Ile Gly Leu Ile Ile Gly Leu Ala Ile Gly Val
305 310 315 320

Phe Arg Thr Ala Pro Leu Ser Glu Asn Lys Val Ile Tyr Gly Leu Gln
325 330 335

Lys Leu Val Gly Trp Val Leu Asn Val Tyr Ile Glu Ile Phe Arg Gly
340 345 350

Thr Pro Met Ile Val Gln Ser Met Val Ile Tyr Tyr Gly Thr Ala Gln
355 360 365

Ala Phe Gly Ile Asn Leu Asp Arg Thr Leu Ala Ala Ile Phe Ile Val
370 375 380

005697 015841

15

281

Gln Asn Glu Val Leu Lys Asp Ile Ser Leu Thr Val His Lys Gly Glu
20 25 30

Val Ile Ser Ile Ile Gly Ser Ser Gly Ser Gly Lys Ser Thr Phe Leu
35 40 45

Arg Ser Ile Asn Leu Leu Glu Thr Pro Thr Asp Gly Gln Ile Leu Tyr
50 55 60

His Gly Gln Asn Val Leu Glu Lys Gly Tyr Asp Leu Thr Gln Tyr Arg
65 70 75 80

Glu Lys Leu Gly Met Val Phe Gln Ser Phe Asn Leu Phe Glu Asn Leu
85 90 95

Asn Val Leu Glu Asn Thr Ile Val Ala Gln Thr Thr Val Leu Lys Arg
100 105 110

Glu Arg Thr Glu Ala Glu Lys Ile Ala Lys Glu Asn Leu Glu Lys Val
115 120 125

Gly Met Gly Glu Arg Tyr Trp Gln Ala Lys Pro Lys Gln Leu Ser Gly
130 135 140

Gly Gln Lys Gln Arg Val Ala Ile Ala Arg Ala Leu Ser Met Asn Pro
145 150 155 160

Asp Ala Ile Leu Phe Asp Glu Pro Thr Ser Ala Leu Asp Pro Glu Met
165 170 175

Val Gly Glu Val Leu Lys Ile Met Gln Asp Leu Ala Gln Glu Gly Leu
180 185 190

Thr M t Ile Val Val Thr His Glu Met Glu Phe Ala Arg Asp Val Ser
195 200 205

His Arg Val Ile Phe Met Asp Lys Gly Val Ile Ala Glu Glu Gly Lys
210 215 220

09769797 043604

282

Pro Glu Asp Leu Phe Thr Asn Pro Lys Glu Asp Arg Thr Lys Glu Phe
225 230 235 240

Leu Gln Arg Tyr Leu Lys
245

<210> 131

<211> 229

<212> PRT

<213> Streptococcus pneumoniae

<400> 131

Met Lys Lys Tyr Gln Leu Leu Phe Lys Ile Ser Ala Val Phe Ser Tyr
1 5 10 15

Leu Phe Phe Val Phe Ser Leu Ser Gln Leu Thr Leu Ile Val Gln Asn
20 25 30

Tyr Trp Gln Phe Ser Ser Gln Ile Gly Asn Leu Phe Trp Ile Gln Asn
35 40 45

Ile Leu Ser Leu Leu Phe Ile Gly Val Met Ile Val Val Leu Val Lys
50 55 60

Thr Gly His Gly Tyr Leu Phe Arg Ile Pro Arg Lys Lys Trp Leu Trp
65 70 75 80

Tyr Ser Ile Leu Thr Val Leu Val Leu Val Phe Gln Ile Ser Phe Asn
85 90 95

Val Gln Thr Ala Lys His Val Gln Ser Thr Ala Glu Gly Trp Ala Val
100 105 110

Leu Ile Gly Tyr Ser Gly Thr Asn Phe Ala Glu Leu Gly Ile Tyr Ile
115 120 125

00560769 043604

283

Ala Leu Phe Phe Leu Val Pro Leu Met Glu Glu Leu Ile Tyr Arg Gly
130 135 140

Leu Leu Gln His Ala Phe Phe Lys His Ser Arg Phe Gly Leu Asp Leu
145 150 155 160

Leu Leu Pro Ser Ile Leu Phe Ala Leu Pro His Phe Ser Ser Leu Pro
165 170 175

Ser Leu Leu Asp Ile Phe Val Phe Ala Thr Val Gly Ile Ile Phe Ala
180 185 190

Gly Leu Thr Arg Tyr Thr Lys Ser Ile Tyr Pro Ser Tyr Ala Val His
195 200 205

Val Ile Asn Asn Ile Val Ala Thr Phe Pro Phe Leu Leu Thr Phe Leu
210 215 220

His Arg Val Leu Gly
225

<210> 132

<211> 350

<212> PRT

<213> Streptococcus pneumoniae

<400> 132

Met Asn Lys Lys Gln Trp Leu Gly Leu Gly Leu Val Ala Val Ala Ala
1 5 10 15

Val Gly Leu Ala Ala Cys Gly Asn Arg Ser Ser Arg Asn Ala Ala Ser
20 25 30

Ser Ser Asp Val Lys Thr Lys Ala Ala Ile Val Thr Asp Thr Gly Gly
35 40 45

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284

Val Asp Asp Lys Ser Phe Asn Gln Ser Ala Trp Glu Gly Leu Gln Ala
50 55 60

Trp Gly Lys Glu His Asn Leu Ser Lys Asp Asn Gly Phe Thr Tyr Phe
65 70 75 80

Gln Ser Thr Ser Glu Ala Asp Tyr Ala Asn Asn Leu Gln Gln Ala Ala
85 90 95

Gly Ser Tyr Asn Leu Ile Phe Gly Val Gly Phe Ala Leu Asn Asn Ala
100 105 110

Val Lys Asp Ala Ala Lys Glu His Thr Asp Leu Asn Tyr Val Leu Ile
115 120 125

Asp Asp Val Ile Lys Asp Gln Lys Asn Val Ala Ser Val Thr Phe Ala
130 135 140

Asp Asn Glu Ser Gly Tyr Leu Ala Gly Val Ala Ala Ala Lys Thr Thr
145 150 155 160

Lys Thr Lys Gln Val Gly Phe Val Gly Gly Ile Glu Ser Glu Val Ile
165 170 175

Ser Arg Phe Glu Ala Gly Phe Lys Ala Gly Val Ala Ser Val Asp Pro
180 185 190

Ser Ile Lys Val Gln Val Asp Tyr Ala Gly Ser Phe Gly Asp Ala Ala
195 200 205

Lys Gly Lys Thr Ile Ala Ala Ala Gln Tyr Ala Ala Gly Ala Asp Ile
210 215 220

Val Tyr Gln Val Ala Gly Gly Thr Gly Ala Gly Val Phe Ala Glu Ala
225 230 235 240

Lys Ser Leu Asn Glu Ser Arg Pro Glu Asn Glu Lys Val Trp Val Ile
245 250 255

00759787 012604

285

Gly Val Asp Arg Asp Gln Glu Ala Glu Gly Lys Tyr Thr Ser Lys Asp
260 265 270

Gly Lys Glu Ser Asn Phe Val Leu Val Ser Thr Leu Lys Gln Val Gly
275 280 285

Thr Thr Val Lys Asp Ile Ser Asn Lys Ala Glu Arg Gly Glu Phe Pro
290 295 300

Gly Gly Gln Val Ile Val Tyr Ser Leu Lys Asp Lys Gly Val Asp Leu
305 310 315 320

Ala Val Thr Asn Leu Ser Glu Glu Gly Lys Lys Ala Val Glu Asp Ala
325 330 335

Lys Ala Lys Ile Leu Asp Gly Ser Val Lys Val Pro Glu Lys
340 345 350

<210> 133

<211> 352

<212> PRT

<213> Streptococcus pneumoniae

<400> 133

Met Ser Lys Lys Leu Gln Gln Ile Ser Val Pro Leu Ile Ser Val Phe
1 5 10 15

Leu Gly Ile Leu Leu Gly Ala Ile Val Met Trp Ile Phe Gly Tyr Asp
20 25 30

Ala Ile Trp Gly Tyr Glu Glu Leu Phe Tyr Thr Ala Phe Gly Ser Leu
35 40 45

Arg Gly Ile Gly Glu Ile Phe Arg Ala Met Gly Pro Leu Val Leu Ile
50 55 60

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[illegible]

Ala Val Glu Gly Leu Gly Thr Phe Gln Asn Val Tyr Val Gln Gly Ser
260 265 270

287

Ser Leu Ala Ile Gly Phe Asn Gly Met Ala Val Ser Leu Leu Ala Ala
275 280 285

Asn Ser Pro Ile Gly Ile Leu Phe Ala Ala Phe Leu Phe Gly Val Leu
290 295 300

Gln Val Gly Ala Pro Gly Met Asn Ala Ala Gln Val Pro Ser Glu Leu
305 310 315 320

Val Ser Ile Val Thr Ala Ser Ile Ile Phe Phe Val Ser Val His Tyr
325 330 335

Leu Ile Glu Arg Phe Val Lys Pro Lys Lys Gln Val Lys Gly Gly Lys
340 345 350

<210> 134

<211> 276

<212> PRT

<213> Streptococcus pneumoniae

<400> 134

Met Gly Val Lys Lys Lys Leu Lys Leu Thr Ser Leu Leu Gly Leu Ser
1 5 10 15

Leu Leu Ile Met Thr Ala Cys Ala Thr Asn Gly Val Thr Ser Asp Ile
20 25 30

Thr Ala Glu Ser Ala Asp Phe Trp Ser Lys Leu Val Tyr Phe Phe Ala
35 40 45

Glu Ile Ile Arg Phe Leu Ser Phe Asp Ile Ser Ile Gly Val Gly Ile
50 55 60

Ile Leu Phe Thr Val Leu Ile Arg Thr Val Leu Leu Pro Val Phe Gln
65 70 75 80

00760787 043601

1. **Содержание:** 1. Введение. 2. Описание объекта исследования. 3. Методика исследования. 4. Результаты исследования. 5. Заключение.

Gln Lys Thr Lys
275

<210> 135

<211> 264

<212> PRT

<213> Streptococcus pneumoniae

<400> 135

Met Val Ile Asp Pro Phe Ala Ile Asn Glu Leu Asp Tyr Tyr Leu Val
 1 5 10 15

Ser His Phe His Ser Asp His Ile Asp Pro Tyr Thr Ala Ala Ala Ile
 20 25 30

Leu Asn Asn Pro Lys Leu Glu His Val Lys Phe Ile Gly Pro Tyr His
 35 40 45

Cys Gly Arg Ile Trp Glu Gly Trp Gly Val Pro Lys Glu Arg Ile Ile
 50 55 60

Val Val Lys Pro Gly Asp Thr Ile Glu Leu Lys Asp Met Lys Ile His
 65 70 75 80

Ala Val Glu Ser Phe Asp Arg Thr Cys Leu Val Thr Leu Pro Val Asn
 85 90 95

Gly Ala Asp Glu Thr Gly Gly Glu Leu Ala Gly Leu Ala Val Thr Asp
 100 105 110

Glu Glu Met Ala Gln Lys Ala Val Asn Tyr Ile Phe Glu Thr Pro Gly
 115 120 125

Gly Thr Ile Tyr His Gly Ala Asp Ser His Phe Ser Asn Tyr Phe Ala
 130 135 140

Lys His Gly Lys Asp Phe Lys Ile Asp Val Ala Leu Asn Asn Tyr Gly
 145 150 155 160

00760787 015604

290

Glu Asn Pro Val Gly Ile Gln Asp Lys Met Thr Ser Ile Asp Leu Leu
165 170 175

Arg Met Ala Glu Asn Leu Arg Thr Lys Val Ile Ile Pro Val His Tyr
180 185 190

Asp Ile Trp Ser Asn Phe Met Ala Ser Thr Asn Glu Ile Leu Glu Leu
195 200 205

Trp Lys Met Arg Lys Asp Arg Leu Gln Tyr Asp Phe His Pro Phe Ile
210 215 220

Trp Glu Val Gly Gly Lys Tyr Thr Tyr Pro Gln Asp Gln His Leu Val
225 230 235 240

Glu Tyr His His Pro Arg Gly Phe Asp Asp Cys Phe Glu Gln Asp Ser
245 250 255

Asn Ile Gln Phe Lys Ala Leu Leu
260

<210> 136

<211> 194

<212> PRT

<213> Streptococcus pneumoniae

<400> 136

Met Phe Leu Ser Gly Trp Leu Ser Ser Phe Ala Asn Thr Tyr Ile His
1 5 10 15

Asp Leu Leu Gly Val Leu Phe Pro Asp Ser Pro Phe Leu Asn Ala Phe
20 25 30

Glu Ser Ala Ile Ala Ala Pro Leu Val Glu Glu Pro Leu Lys Leu Leu
35 40 45

00750767 013501

291

Ser Leu Val Phe Val Leu Ala Leu Ile Pro Val Arg Lys Leu Lys Ser
50 55 60

Leu Phe Leu Leu Gly Ile Ala Ser Gly Leu Gly Phe Gln Met Ile Lys
65 70 75 80

Asp Ile Gly Tyr Ile Arg Thr Asp Leu Pro Glu Gly Phe Asp Phe Thr
85 90 95

Ile Ser Arg Ile Leu Glu Arg Ile Ile Ser Gly Ile Ala Ser His Trp
100 105 110

Thr Phe Ser Gly Leu Ala Val Val Gly Val Tyr Leu Leu Tyr Arg Ala
115 120 125

Tyr Lys Gly Gln Lys Val Gly Lys Lys Gln Gly Leu Ile Phe Leu Gly
130 135 140

Leu Ala Leu Gly Thr His Phe Leu Phe Asn Ser Pro Phe Val Glu Leu
145 150 155 160

Glu Thr Glu Leu Pro Leu Ala Ile Pro Val Val Thr Ala Ile Ala Leu
165 170 175

Tyr Gly Phe Tyr His Ala Tyr Cys Phe Val Glu Lys His Asn Glu Leu
180 185 190

Met Thr

<210> 137

<211> 129

<212> PRT

<213> Streptococcus pneumoniae

<400> 137

Met Lys Val Glu Pro Arg Cys Asp Val Leu Ser Arg Met Ser His Phe

1

5

10

15

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292

Phe Ile Arg Ile Leu Ile Met Glu Leu Gln Glu Leu Val Glu Arg Ser
20 25 30

Trp Ala Ile Arg Gln Ala Tyr His Glu Leu Glu Val Lys His His Asp
35 40 45

Ser Lys Trp Thr Val Glu Glu Asp Leu Leu Ala Leu Ser Asn Asp Ile
50 55 60

Gly Asn Phe Gln Arg Leu Val Met Thr Lys Gln Gly Arg Tyr Tyr Asp
65 70 75 80

Glu Thr Pro Tyr Thr Leu Glu Gln Lys Leu Ser Glu Asn Ile Trp Trp
85 90 95

Leu Leu Glu Leu Ser Gln Arg Leu Asp Ile Asp Ile Leu Thr Glu Met
100 105 110

Glu Asn Phe Leu Ser Asp Lys Glu Lys Gln Leu Asn Val Arg Thr Trp
115 120 125

Lys

<210> 138

<211> 324

<212> PRT

<213> Streptococcus pneumoniae

<400> 138

Met Leu Asp Trp Lys Gln Phe Phe Leu Ala Tyr Leu Arg Ser Arg Ser
1 5 10 15

Arg Leu Phe Ile Tyr Leu Leu Ser Leu Ala Phe Leu Val Leu Leu Phe
20 25 30

00369787-013604

Gln Phe Leu Phe Ala Ser Leu Gly Ile Tyr Phe Leu Tyr Phe Phe Phe
 35 40 45

Leu Cys Cys Phe Val Thr Ile Leu Phe Phe Thr Trp Asp Ile Leu Val
 50 55 60

Glu Thr Gln Val Tyr Arg Gln Glu Leu Leu Tyr Gly Glu Arg Glu Ala
 65 70 75 80

Lys Ser Pro Leu Glu Ile Ala Leu Ala Glu Lys Leu Glu Ala Arg Glu
 85 90 95

Met Glu Leu Tyr Gln Gln Arg Ser Lys Ala Glu Arg Lys Leu Thr Asp
 100 105 110

Leu Leu Asp Tyr Tyr Thr Leu Trp Val His Gln Ile Lys Thr Pro Ile
 115 120 125

Ala Ala Ser Gln Leu Leu Val Ala Glu Val Val Asp Arg Gln Leu Lys
 130 135 140

Gln Gln Leu Glu Gln Glu Ile Phe Lys Ile Asp Ser Tyr Thr Asn Leu
 145 150 155 160

Val Leu Gln Tyr Leu Arg Leu Glu Ser Phe His Asp Asp Leu Val Leu
 165 170 175

Lys Gln Val Gln Ile Glu Asp Leu Val Lys Glu Ile Ile Arg Lys Tyr
 180 185 190

Ala Leu Phe Phe Ile Gln Lys Gly Leu Asn Val Asn Leu His Asp Leu
 195 200 205

Asp Lys Glu Ile Val Thr Asp Lys Lys Trp Leu Leu Val Val Ile Glu
 210 215 220

Gln Ile Ile Ser Asn Ser Leu Lys Tyr Thr Lys Glu Gly Gly Leu Glu
 225 230 235 240

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294

Ile Tyr Met Asp Asp Gln Glu Leu Cys Ile Lys Asp Thr Gly Ile Gly
245 250 255

Ile Lys Asn Ser Asp Val Leu Arg Val Phe Glu Arg Gly Phe Ser Gly
260 265 270

Tyr Asn Gly Arg Leu Thr Gln Gln Ser Ser Gly Leu Gly Leu Tyr Leu
275 280 285

Ser Lys Lys Ile Ser Glu Glu Leu Gly His Gln Ile Arg Ile Glu Ser
290 295 300

Glu Val Gly Lys Gly Thr Thr Val Arg Ile Gln Phe Ala Gln Val Asn
305 310 315 320

Leu Val Leu Glu

<210> 139

<211> 195

<212> PRT

<213> Streptococcus pneumoniae

<400> 139

Met Glu Leu Asn Thr His Asn Ala Glu Ile Leu Leu Ser Ala Ala Asn
1 5 10 15

Lys Ser His Tyr Pro Gln Asp Glu Leu Pro Glu Ile Ala Leu Ala Gly
20 25 30

Arg Ser Asn Val Gly Lys Ser Ser Phe Ile Asn Thr Met Leu Asn Arg
35 40 45

Lys Asn Leu Ala Arg Thr Ser Gly Lys Pro Gly Lys Thr Gln Leu Leu
50 55 60

005697 013501

295

Asn Phe Phe Asn Ile Asp Asp Lys Met Arg Phe Val Asp Val Pro Gly
65 70 75 80

Tyr Gly Tyr Ala Arg Val Ser Lys Lys Glu Arg Glu Lys Trp Gly Cys
85 90 95

Met Ile Glu Glu Tyr Leu Thr Thr Arg Glu Asn Leu Arg Ala Val Val
100 105 110

Ser Leu Val Asp Leu Arg His Asp Pro Ser Ala Asp Asp Val Gln Met
115 120 125

Tyr Glu Phe Leu Lys Tyr Tyr Glu Ile Pro Val Ile Ile Val Ala Thr
130 135 140

Lys Ala Asp Lys Ile Pro Arg Gly Lys Trp Asn Lys His Glu Ser Ala
145 150 155 160

Ile Lys Lys Lys Leu Asn Phe Asp Pro Ser Asp Asp Phe Ile Leu Phe
165 170 175

Ser Ser Val Ser Lys Ala Gly Met Asp Glu Ala Trp Asp Ala Ile Leu
180 185 190

Glu Lys Leu
195

<210> 140

<211> 296

<212> PRT

<213> Streptococcus pneumoniae

<400> 140

Met Thr Lys Lys Gln Leu His Leu Val Ile Val Thr Gly Met Ser Gly
1 5 10 15

00769787-012601

296

Ala Gly Lys Thr Val Ala Ile Gln Ser Phe Glu Asp Leu Gly Tyr Phe
20 25 30

Thr Ile Asp Asn Met Pro Pro Ala Leu Leu Pro Lys Phe Leu Gln Leu
35 40 45

Val Glu Ile Lys Glu Asp Asn Pro Lys Leu Ala Leu Val Val Asp Met
50 55 60

Arg Ser Arg Ser Phe Phe Ser Glu Ile Gln Ala Val Leu Asp Glu Leu
65 70 75 80

Glu Asn Gln Asp Gly Leu Asp Phe Lys Ile Leu Phe Leu Asp Ala Ala
85 90 95

Asp Lys Glu Leu Val Ala Arg Tyr Lys Glu Thr Arg Arg Ser His Pro
100 105 110

Leu Ala Ala Asp Gly Arg Ile Leu Asp Gly Ile Lys Leu Glu Arg Glu
115 120 125

Leu Leu Ala Pro Leu Lys Asn Met Ser Gln Asn Val Val Asp Thr Thr
130 135 140

Glu Leu Thr Pro Arg Glu Leu Arg Lys Thr Leu Ala Glu Gln Phe Ser
145 150 155 160

Asp Gln Glu Gln Ala Gln Ser Phe Arg Ile Glu Val Met Ser Phe Gly
165 170 175

Phe Lys Tyr Gly Ile Pro Ile Asp Ala Asp Leu Val Phe Asp Val Arg
180 185 190

Phe Leu Pro Asn Pro Tyr Tyr Leu Pro Glu Leu Arg Asn Gln Thr Gly
195 200 205

Val Asp Glu Pro Val Tyr Asp Tyr Val Met Asn His Pro Glu Ser Glu
210 215 220

00360797-013604

297

Asp Phe Tyr Gln His Leu Leu Ala Leu Ile Glu Pro Ile L u Pro Ser
225 230 235 240

Tyr Gln Lys Glu Gly Lys Ser Val Leu Thr Ile Ala Met Gly Cys Thr
245 250 255

Gly Gly Gln His Arg Ser Val Ala Phe Ala Lys Arg Leu Ala Gln Asp
260 265 270

Leu Ser Lys Asn Trp Ser Val Asn Glu Gly His Arg Asp Lys Asp Arg
275 280 285

Arg Lys Glu Thr Val Asn Arg Ser
290 295

<210> 141

<211> 325

<212> PRT

<213> Streptococcus pneumoniae

<400> 141

Met Arg Lys Pro Lys Ile Thr Val Ile Gly Gly Gly Thr Gly Ser Pro
1 5 10 15

Val Ile Leu Lys Ser Leu Arg Glu Lys Asp Val Glu Ile Ala Ala Ile
20 25 30

Val Thr Val Ala Asp Asp Gly Gly Ser Ser Gly Glu Leu Arg Lys Asn
35 40 45

Met Gln Gln Leu Thr Pro Pro Gly Asp Leu Arg Asn Val Leu Val Ala
50 55 60

Met Ser Asp Met Pro Lys Phe Tyr Glu Lys Val Phe Gln Tyr Arg Phe
65 70 75 80

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298

Ser Glu Asp Ala Gly Ala Phe Ala Gly His Pro Leu Gly Asn Leu Ile
85 90 95

Ile Ala Gly Leu Ser Glu Met Gln Gly Ser Thr Tyr Asn Ala Met Gln
100 105 110

Leu Leu Ser Lys Phe Phe His Thr Thr Gly Lys Ile Tyr Pro Ser Ser
115 120 125

Asp His Pro Leu Thr Leu His Ala Val Phe Gln Asp Gly Thr Glu Val
130 135 140

Ala Gly Glu Ser His Ile Val Asp His Arg Gly Ile Ile Asp Asn Val
145 150 155 160

Tyr Val Thr Asn Ala Leu Asn Asp Asp Thr Pro Leu Ala Ser Arg Arg
165 170 175

Val Val Gln Thr Ile Leu Glu Ser Asp Met Ile Val Leu Gly Pro Gly
180 185 190

Ser Leu Phe Thr Ser Ile Leu Pro Asn Ile Val Ile Lys Glu Ile Gly
195 200 205

Arg Ala Leu Leu Glu Thr Lys Ala Glu Ile Ala Tyr Val Cys Asn Ile
210 215 220

Met Thr Gln Arg Gly Glu Thr Glu His Phe Thr Asp Ser Asp His Val
225 230 235 240

Glu Val Leu His Arg His Leu Gly Arg Pro Phe Ile Asp Thr Val Leu
245 250 255

Val Asn Ile Glu Lys Val Pro Gln Glu Tyr Met Asn Ser Asn Arg Phe
260 265 270

Asp Glu Tyr Leu Val Gln Val Glu His Asp Phe Val Gly Leu Cys Lys
275 280 285

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299

Gln Val Ser Arg Val Ile Ser Ser Asn Phe Leu Arg Leu Glu Asn Gly
290 295 300

Gly Ala Phe His Asp Gly Asp Leu Ile Val Asp Glu Leu Met Arg Ile
305 310 315 320

Ile Gln Val Lys Lys
325

<210> 142

<211> 392

<212> PRT

<213> Streptococcus pneumoniae

<400> 142

Met Lys Asn Leu Ile Lys Leu Leu Ile Ile Arg Leu Ile Val Asn Leu
1 5 10 15

Ala Asp Ser Val Phe Tyr Ile Val Ala Leu Trp His Val Ser Asn Asn
20 25 30

Tyr Ser Ser Ser Met Phe Leu Gly Ile Phe Ile Ala Val Asn Tyr Leu
35 40 45

Pro Asp Leu Leu Leu Ile Phe Phe Gly Pro Val Ile Asp Arg Val Asn
50 55 60

Pro Gln Lys Ile Leu Ile Ile Ser Ile Leu Val Gln Leu Ala Val Ala
65 70 75 80

Val Ile Phe Leu Leu Leu Leu Asn Gln Ile Ser Phe Trp Val Ile Met
85 90 95

S r Leu Val Phe Ile Ser Val Met Ala Ser Ser Ile Ser Tyr Val Ile
100 105 110

003637 01600

300

Glu Asp Val Leu Ile Pro Gln Val Val Glu Tyr Asp Lys Ile Val Phe
115 120 125

Ala Asn Ser Leu Phe Ser Ile Ser Tyr Lys Val Leu Asp Ser Ile Phe
130 135 140

Asn Ser Phe Ala Ser Phe Leu Gln Val Ala Val Gly Phe Ile Leu Leu
145 150 155 160

Val Lys Ile Asp Ile Gly Ile Phe Leu Leu Ala Leu Phe Ile Leu Leu
165 170 175

Leu Leu Lys Phe Arg Thr Ser Asn Ala Asn Ile Glu Asn Phe Ser Phe
180 185 190

Lys Tyr Tyr Lys Arg Glu Val Leu Gln Gly Thr Lys Phe Ile Leu Asn
195 200 205

Asn Lys Leu Leu Phe Lys Thr Ser Ile Ser Leu Thr Leu Ile Asn Phe
210 215 220

Phe Tyr Ser Phe Gln Thr Val Val Val Pro Ile Phe Ser Ile Arg Tyr
225 230 235 240

Phe Asp Gly Pro Ile Phe Tyr Gly Ile Phe Leu Thr Ile Ala Gly Leu
245 250 255

Gly Gly Ile Leu Gly Asn Met Leu Ala Pro Ile Val Ile Lys Tyr Leu
260 265 270

Lys Ser Asn Gln Ile Val Gly Val Phe Leu Phe Leu Asn Gly Ser Ser
275 280 285

Trp Leu Val Ala Ile Val Ile Lys Asp Tyr Thr Leu Ser Leu Ile Leu
290 295 300

Phe Phe Val Cys Phe Met Ser Lys Gly Val Phe Asn Ile Ile Phe Asn
305 310 315 320

0036979 04360
FOUO 28263260

Arg Lys Thr Lys Arg Lys Phe Phe Phe Gly Val Leu Thr Gly Trp Leu
65 70 75 80

[illegible]

Lys
225

<210> 144

<211> 385

<212> PRT

<213> Streptococcus pneumoniae

<400> 144

Leu Lys Lys Pro Ile Ile Glu Phe Lys Asn Val Ser Lys Val Phe Glu

1 5 10 15

Asp Ser Asn Thr Lys Val Leu Lys Asp Ile Asn Phe Glu Leu Glu Glu

20 25 30

Gly Lys Phe Tyr Thr Leu Leu Gly Ala Ser Gly Ser Gly Lys Ser Thr

35 40 45

Ile Leu Asn Ile Ile Ala Gly Leu Leu Asp Ala Thr Thr Gly Asp Ile

50 55 60

Met Leu Asp Gly Val Arg Ile Asn Asp Ile Pro Thr Asn Lys Arg Asp

65 70 75 80

Val His Thr Val Phe Gln Ser Tyr Ala Leu Phe Pro His Met Asn Val

85 90 95

Phe Glu Asn Val Ala Phe Pro Leu Arg Leu Arg Lys Ile Asp Lys Lys

100 105 110

Glu Ile Glu Gln Arg Val Ala Glu Val Leu Lys Met Val Gln Leu Glu

115 120 125

Gly Tyr Glu Lys Arg Ser Ile Arg Lys Leu Ser Gly Gly Gln Arg Gln

130 135 140

Arg Val Ala Ile Ala Arg Ala Ile Ile Asn Gln Pro Arg Val Val Leu

145 150 155 160

Leu Asp Glu Pro Leu Ser Ala Leu Asp Leu Lys Leu Arg Thr Asp Met

165 170 175

10560 2626260

Abstract

Ala Gly Leu Ile Asn Ala Ile Glu Glu Glu Arg Asp Glu Glu Asn Lys
370 375 380

Leu

385

<210> 145

<211> 206

<212> PRT

<213> Streptococcus pneumoniae

<400> 145

Met Lys Ser Met Arg Ile Leu Phe Leu Leu Ala Leu Ile Gln Ile Ser

1 5 10 15

Leu Ser Ser Cys Phe Leu Trp Lys Glu Cys Ile Leu Ser Phe Lys Gln

20 25 30

Ser Thr Ala Phe Phe Ile Gly Ser Met Val Phe Val Ser Gly Ile Cys

35 40 45

Ala Gly Val Asn Tyr Leu Tyr Thr Arg Lys Gln Glu Val His Ser Val

50 55 60

Leu Ala Ser Lys Lys Ser Val Lys Leu Phe Tyr Ser Met Leu Leu Leu

65 70 75 80

Ile Asn Leu Leu Gly Ala Val Leu Val Leu Ser Asp Asn Leu Phe Ile

85 90 95

Lys Asn Thr Leu Gln Gln Glu Leu Val Asp Phe Leu Leu Pro Ser Phe

100 105 110

Phe Phe Leu Phe Gly Leu Asp Leu Leu Ile Phe Leu Pro Leu Lys Lys

115 120 125

Tyr Val Arg Asp Phe Leu Ala Met Leu Asp Arg Lys Lys Thr Val Leu

130 135 140

09259797-013604

Case Study

Ser Tyr Gln Ile Val Ser Arg Ala His Met Leu Glu Met Gln Asn Leu
290 295 300

308

Leu Arg Arg Ser Leu Gly Gln Glu Glu Val Thr Gln Leu Glu Thr Asn
305 310 315 320

Ala Val Leu Phe Glu Asp Leu Phe Gly Arg Ala Pro Val Gly Asp Glu
325 330 335

Asp Asn

<210> 147

<211> 331

<212> PRT

<213> Streptococcus pneumoniae

<400> 147

Met Lys Lys Gln Ala Tyr Val Ile Ile Ala Leu Thr Ser Phe Leu Phe
1 5 10 15

Val Phe Phe Phe Ser His Ser Leu Leu Glu Ile Leu Asp Phe Asp Trp
20 25 30

Ser Ile Phe Leu His Asp Val Glu Lys Thr Glu Lys Phe Val Phe Leu
35 40 45

Leu Leu Val Phe Ser Met Ser Met Thr Cys Leu Leu Ala Leu Phe Trp
50 55 60

Arg Gly Ile Glu Glu Leu Ser Leu Arg Lys Met Gln Ala Asn Leu Lys
65 70 75 80

Arg Leu Leu Ala Gly Gln Glu Val Val Gln Val Ala Asp Pro Asp Leu
85 90 95

Asp Ala Ser Phe Lys Ser Leu Ser Gly Lys Leu Asn Leu Leu Thr Glu
100 105 110

007607 01301
005610 26269260

Ala Leu Gln Lys Ala Glu Asn Gln Ser Leu Ala Gln Glu Glu Ile
115 120 125

Ile Glu Lys Glu Arg Lys Arg Ile Ala Arg Asp Leu His Asp Thr Val
130 135 140

Ser Gln Glu Leu Phe Ala Ala His Met Ile Leu Ser Gly Ile Ser Gln
145 150 155 160

Gln Ala Leu Lys Leu Asp Arg Glu Lys Met Gln Thr Gln Leu Gln Ser
165 170 175

Val Thr Ala Ile Leu Glu Thr Ala Gln Lys Asp Leu Arg Val Leu Leu
180 185 190

Leu His Leu Arg Pro Val Glu Leu Glu Gln Lys Ser Leu Ile Glu Gly
195 200 205

Ile Gln Ile Leu Leu Lys Glu Leu Glu Asp Lys Ser Asp Leu Arg Val
210 215 220

Ser Leu Lys Gln Asn Met Thr Lys Leu Pro Lys Lys Ile Glu Glu His
225 230 235 240

Ile Phe Arg Ile Leu Gln Glu Leu Ile Ser Asn Thr Leu Arg His Ala
245 250 255

Gln Ala Ser Cys Leu Asp Val Tyr Leu Tyr Gln Thr Asp Val Glu Leu
260 265 270

Gln Leu Lys Val Val Asp Asn Gly Ile Gly Phe Gln Leu Gly Ser Leu
275 280 285

Asp Asp Leu Ser Tyr Gly Leu Arg Asn Ile Lys Glu Arg Val Glu Asp
290 295 300

Met Ala Gly Thr Val Gln Leu Leu Thr Ala Pro Lys Gln Gly Leu Ala
305 310 315 320

00769797 012504

310

Val Asp Ile Arg Ile Pro Leu Leu Asp Lys Glu

325

330

<210> 148

<211> 288

<212> PRT

<213> Streptococcus pneumoniae

<400> 148

Met Ile Val Ser Ile Ile Ser Gln Gly Phe Val Trp Ala Ile Leu Gly

1

5

10

15

Leu Gly Ile Phe Met Thr Phe Arg Ile Leu Asn Phe Pro Asp Met Thr

20

25

30

Thr Glu Gly Ser Phe Pro Leu Gly Gly Ala Val Ala Val Thr Leu Ile

35

40

45

Thr Lys Gly Val Asn Pro Phe Leu Ala Thr Leu Val Ala Val Gly Ala

50

55

60

Gly Cys Leu Ala Gly Met Ala Ala Gly Leu Leu Tyr Thr Lys Gly Lys

65

70

75

80

Ile Pro Thr Leu Leu Ser Gly Ile Leu Val Met Thr Ser Cys His Ser

85

90

95

Ile Met Leu Leu Ile Met Gly Arg Ala Asn Leu Gly Leu Leu Gly Thr

100

105

110

Lys Gln Ile Gln Asp Val Leu Pro Phe Asp Ser Asp Leu Asn Gln Leu

115

120

125

Leu Thr Gly Leu Ile Phe Val Ser Ile Val Ile Ala Leu Met Leu Phe

130

135

140

005697 0130

311

Phe Leu Asp Thr Lys Leu Gly Gln Ala Tyr Ile Ala Thr Gly Asp Asn
145 150 155 160

Pro Asp Met Ala Arg Ser Phe Gly Ile His Thr Gly Arg Met Glu Leu
165 170 175

Met Gly Leu Val Leu Ser Asn Gly Val Ile Ala Leu Ala Gly Ala Leu
180 185 190

Ile Ala Gln Gln Glu Gly Tyr Ala Asp Val Ser Arg Gly Ile Gly Val
195 200 205

Ile Val Val Gly Leu Ala Ser Leu Ile Ile Gly Glu Val Ile Phe Lys
210 215 220

Ser Leu Ser Leu Ala Glu Arg Leu Val Thr Ile Val Val Gly Ser Ile
225 230 235 240

Ala Tyr Gln Phe Leu Val Trp Ala Val Ile Ala Leu Gly Phe Asn Thr
245 250 255

Ser Tyr Leu Arg Leu Tyr Ser Ala Leu Ile Leu Ala Val Cys Leu Met
260 265 270

Ile Pro Thr Phe Lys Gln Thr Ile Leu Lys Gly Ala Lys Leu Ser Lys
275 280 285

<210> 149

<211> 355

<212> PRT

<213> Streptococcus pneumoniae

<400> 149

M t Lys Lys Met Lys Val Trp Ser Thr Val Leu Ala Thr Gly Val Ala
1 5 10 15

00769397 013501

312

Leu Thr Thr Leu Ala Ala Cys Ser Gly Gly Ser Asn Ser Thr Thr Ala
20 25 30

Ser Ser Ser Glu Glu Lys Ala Asp Lys Ser Gln Glu Leu Val Ile Tyr
35 40 45

Ser Asn Ser Val Ser Asn Gly Arg Gly Asp Trp Leu Thr Ala Lys Ala
50 55 60

Lys Glu Ala Gly Phe Asn Ile Lys Met Val Asp Ile Ala Gly Ala Gln
65 70 75 80

Leu Ala Asp Arg Val Ile Ala Glu Lys Asn Asn Ala Val Ala Asp Met
85 90 95

Val Phe Gly Ile Gly Ala Val Asp Ser Asn Lys Ile Arg Asp Gln Lys
100 105 110

Leu Leu Val Gln Tyr Lys Pro Lys Trp Leu Asp Lys Ile Asp Gln Ser
115 120 125

Leu Ser Asp Lys Asp Asn Tyr Tyr Asn Pro Val Ile Val Gln Pro Leu
130 135 140

Val Leu Ile Gly Ala Pro Asp Val Lys Glu Met Pro Lys Asp Trp Thr
145 150 155 160

Glu Leu Gly Ser Lys Tyr Lys Gly Lys Tyr Ser Ile Ser Gly Leu Gln
165 170 175

Gly Gly Thr Gly Arg Ala Ile Leu Ala Ser Ile Leu Val Arg Tyr Leu
180 185 190

Asp Asp Lys Gly Glu Leu Gly Val Ser Glu Lys Gly Trp Glu Val Ala
195 200 205

Lys Glu Tyr Leu Lys Asn Ala Tyr Thr Leu Gln Lys Gly Glu Ser Ser
210 215 220

00760707 012504

313

Ile Val Lys Met Leu Asp Lys Glu Asp Pro Ile Gln Tyr Gly Met Met
225 230 235 240

Trp Gly Ser Gly Ala Leu Val Gly Gln Lys Glu Gln Asn Val Val Phe
245 250 255

Lys Val Met Thr Pro Glu Ile Gly Val Pro Phe Val Thr Glu Gln Thr
260 265 270

Met Val Leu Ser Thr Ser Lys Lys Gln Ala Leu Ala Lys Glu Phe Ile
275 280 285

Asp Trp Phe Gly Gln Ser Glu Ile Gln Val Glu Tyr Ser Lys Asn Phe
290 295 300

Gly Ser Ile Pro Ala Asn Lys Asp Ala Leu Lys Asp Leu Pro Glu Asp
305 310 315 320

Thr Lys Lys Phe Val Asp Gln Val Lys Pro Gln Asn Ile Asp Trp Glu
325 330 335

Ala Val Gly Lys His Leu Asp Glu Trp Val Glu Lys Ala Glu Leu Glu
340 345 350

Tyr Val Gln
355

<210> 150

<211> 336

<212> PRT

<213> Streptococcus pneumoniae

<400> 150

Met Ile Lys Phe Asp Asn Ile Gln Ile Lys Tyr Gly Asp Phe Val Ala

1

5

10

15

005670 28269260

314

Ile Asp Asn Leu Asn Leu Asp Ile His Glu Gly Glu Phe Phe Thr Phe
20 25 30

Leu Gly Pro Ser Gly Cys Gly Lys Ser Thr Thr Leu Arg Ala Leu Val
35 40 45

Gly Phe Leu Asp Pro Ser Ser Gly Ser Ile Glu Val Asn Gly Thr Asp
50 55 60

Val Thr His Leu Glu Pro Glu Lys Arg Gly Ile Gly Ile Val Phe Gln
65 70 75 80

Ser Tyr Ala Leu Phe Pro Thr Met Thr Val Phe Asp Asn Ile Ala Phe
85 90 95

Gly Leu Lys Val Lys Lys Val Ala Pro Asp Val Ile Lys Ala Lys Val
100 105 110

Ser Ala Val Ala Ala Lys Ile Lys Ile Ser Asp Gln Gln Leu Gln Arg
115 120 125

Asn Val Ser Glu Leu Ser Gly Gly Gln Gln Gln Arg Val Ala Leu Ala
130 135 140

Arg Ala Leu Val Leu Glu Pro Lys Ile Leu Cys Leu Asp Glu Pro Leu
145 150 155 160

Ser Asn Leu Asp Ala Lys Leu Arg Val Asp Leu Arg Lys Glu Leu Lys
165 170 175

Arg Leu Gln Lys Glu Leu Gly Ile Thr Thr Leu Tyr Val Thr His Asp
180 185 190

Gln Glu Glu Ala Leu Thr Leu Ser Asp Arg Ile Ala Val Phe Asn Asn
195 200 205

Gly Tyr Ile Glu Gln Val Gly Thr Pro Val Glu Ile Tyr His Asn Ser
210 215 220

00769707 043504

315

Gln Thr Glu Phe Val Cys Asp Phe Ile Gly Asp Ile Asn Val Leu Thr
225 230 235 240

Asp Glu Thr Val His Glu Val Leu Leu Lys Asn Thr Ser Val Phe Leu
245 250 255

Glu Asp Lys Lys Gly Tyr Ile Arg Leu Glu Lys Val Arg Phe Asn Arg
260 265 270

Glu Thr Glu Gln Asp Phe Ile Leu Lys Gly Thr Ile Ile Asp Val Glu
275 280 285

Phe Ser Gly Val Thr Ile His Tyr Thr Ile Lys Val Ser Glu Ser Gln
290 295 300

Ile Leu Asn Val Thr Ser Ile Asp Ser Gln Ala Ala Ile Arg Ser Val
305 310 315 320

Gly Glu Ser Val Glu Leu Phe Ile Thr Pro Ser Asp Val Leu Gln Phe
325 330 335

<210> 151

<211> 563

<212> PRT

<213> Streptococcus pneumoniae

<400> 151

Met Arg His Lys Leu Asn Leu Lys Asp Trp Leu Ile Arg Leu Gly Leu
1 5 10 15

Ile Trp Phe Leu Val Thr Phe Ile Ile Tyr Pro Asn Phe Asp Leu Val
20 25 30

00760707 043504

316

Val Asn Val Phe Val Lys Gly Gly Glu Phe Ser Leu Asp Ala Val His
35 40 45

Arg Val Leu Lys Ser Gln Arg Ala Leu Gln Ser Ile Met Asn Ser Phe
50 55 60

Lys Leu Ala Phe Ser Leu Ile Ile Thr Val Asn Val Val Gly Ile Leu
65 70 75 80

Cys Val Leu Phe Thr Glu Tyr Phe Asp Ile Lys Gly Ala Lys Ile Leu
85 90 95

Lys Leu Gly Tyr Met Thr Ser Leu Ile Tyr Gly Gly Val Val Leu Ala
100 105 110

Thr Gly Tyr Lys Phe Val Tyr Gly Pro Tyr Gly Leu Ile Thr Lys Phe
115 120 125

Leu Gln Asn Val Ile Pro Ser Leu Asp Pro Asn Trp Phe Ile Gly Tyr
130 135 140

Gly Ala Val Leu Phe Ile Met Thr Phe Ser Gly Thr Ala Asn His Thr
145 150 155 160

Leu Phe Leu Thr Asn Thr Ile Arg Ser Val Asp Tyr His Thr Ile Glu
165 170 175

Ala Ala Arg Asn Met Gly Ala Lys Pro Phe Thr Val Phe Arg Lys Val
180 185 190

Val Leu Pro Thr Leu Ile Pro Thr Leu Phe Ala Leu Thr Ile Met Val
195 200 205

Phe Leu Ser Gly Leu Ser Ala Val Ala Ala Pro Met Ile Val Gly Gly
210 215 220

Lys Glu Phe Gln Thr Ile Asn Pro Met Ile Ile Thr Phe Ala Gly Met
225 230 235 240

007697 012601

[illegible]

Leu Leu Ile Ala Tyr Ile Val Val Lys Ile Pro Phe Ser Tyr Arg Met
435 440 445

318

Val Arg Ala Ile Leu Phe Ser Val Asp Asp Glu Met Glu Asp Ala Ala
450 455 460

Arg Ser Met Gly Ala Ser Pro Phe Tyr Thr Met Met Lys Val Ile Ile
465 470 475 480

Pro Phe Ile Leu Pro Val Val Leu Ser Val Ile Ala Leu Asn Phe Asn
485 490 495

Ser Leu Leu Thr Asp Phe Asp Leu Ser Val Phe Leu Tyr His Pro Leu
500 505 510

Ala Gln Pro Leu Gly Ile Thr Ile Arg Ser Ala Gly Asp Glu Thr Ala
515 520 525

Thr Ser Asn Ala Gln Ala Leu Val Phe Val Tyr Thr Ile Val Leu Met
530 535 540

Ile Ile Ser Gly Thr Val Leu Tyr Phe Thr Gln Arg Pro Gly Arg Lys
545 550 555 560

Val Arg Lys

<210> 152

<211> 443

<212> PRT

<213> Streptococcus pneumoniae

<400> 152

Met Ile Lys Asn Pro Lys Leu Leu Thr Lys Ser Phe Leu Arg Ser Phe
1 5 10 15

Ala Ile Leu Gly Gly Val Gly Leu Val Ile His Ile Ala Ile Tyr Leu
20 25 30

00769707 043604

Thr Phe Pro Phe Tyr Tyr Ile Gln Leu Glu Gly Glu Lys Phe Asn Glu
35 40 45

Ser Ala Arg Val Phe Thr Glu Tyr Leu Lys Thr Lys Thr Ser Asp Glu
50 55 60

Ile Pro Ser Leu Leu Gln Ser Tyr Ser Lys Ser Leu Thr Ile Ser Ala
65 70 75 80

His Leu Lys Arg Asp Ile Val Asp Lys Arg Leu Pro Leu Val His Asp
85 90 95

Leu Asp Ile Lys Asp Gly Lys Leu Ser Asn Tyr Ile Val Met Leu Asp
100 105 110

Met Ser Val Ser Thr Ala Asp Gly Lys Gln Val Thr Val Gln Phe Val
115 120 125

His Gly Val Asp Val Tyr Lys Glu Ala Lys Asn Ile Leu Leu Leu Tyr
130 135 140

Leu Pro Tyr Thr Phe Leu Val Thr Ile Ala Phe Ser Phe Val Phe Ser
145 150 155 160

Tyr Phe Tyr Thr Lys Arg Leu Leu Asn Pro Leu Phe Tyr Ile Ser Glu
165 170 175

Val Thr Ser Lys Met Gln Asp Leu Asp Asp Asn Ile Arg Phe Asp Glu
180 185 190

Ser Arg Lys Asp Glu Val Gly Glu Val Gly Lys Gln Ile Asn Gly Met
195 200 205

Tyr Glu His Leu Leu Lys Val Ile Tyr Glu Leu Glu Ser Arg Asn Glu
210 215 220

Gln Ile Val Lys Leu Gln Asn Gln Lys Val Ser Phe Val Arg Gly Ala
225 230 235 240

00269707 013504

320

Ser His Glu Leu Lys Thr Pro Leu Ala Ser Leu Arg Ile Ile Leu Glu
245 250 255

Asn Met Gln His Asn Ile Gly Asp Tyr Lys Asp His Pro Lys Tyr Ile
260 265 270

Ala Lys Ser Ile Asn Lys Ile Asp Gln Met Ser His Leu Leu Glu Glu
275 280 285

Val Leu Glu Ser Ser Lys Phe Gln Glu Trp Thr Glu Cys Arg Glu Thr
290 295 300

Leu Thr Val Lys Pro Val Leu Val Asp Ile Leu Ser Arg Tyr Gln Glu
305 310 315 320

Leu Ala His Ser Ile Gly Val Thr Ile Glu Asn Gln Leu Thr Asp Ala
325 330 335

Thr Arg Val Val Met Ser Leu Arg Ala Leu Asp Lys Val Leu Thr Asn
340 345 350

Leu Ile Ser Asn Ala Ile Lys Tyr Ser Asp Lys Asn Gly Arg Val Ile
355 360 365

Ile Ser Glu Gln Asp Gly Tyr Leu Ser Ile Lys Asn Thr Cys Ala Pro
370 375 380

Leu Ser Asp Gln Glu Leu Glu His Leu Phe Asp Ile Phe Tyr His Ser
385 390 395 400

Gln Ile Val Thr Asp Lys Asp Glu Ser Ser Gly Leu Gly Leu Tyr Ile
405 410 415

Val Asn Asn Ile Leu Glu Ser Tyr Gln Met Asp Tyr Ser Phe Leu Pro
420 425 430

Tyr Glu His Gly Met Glu Phe Lys Ile Ser Leu
435 440

00769787 01504

<210> 153

<211> 290

<212> PRT

<213> Streptococcus pneumoniae

<400> 153

Met Asp Lys Ile Ile Lys Thr Ile Ser Glu Ser Gly Ala Phe Arg Ala
 1 5 10 15

Phe Val Leu Asp Ser Thr Glu Thr Val Arg Thr Ala Gln Glu Lys His
 20 25 30

Gln Thr Gln Ala Ser Ser Thr Val Ala Leu Gly Arg Thr Leu Ile Ala
 35 40 45

Ser Gln Ile Leu Ala Ala Asn Glu Lys Gly Asn Thr Lys Leu Thr Val
 50 55 60

Lys Val Leu Gly Ser Ser Ser Leu Gly Ala Ile Ile Thr Val Ala Asp
 65 70 75 80

Thr Lys Gly Asn Val Lys Gly Tyr Val Gln Asn Pro Gly Val Asp Ile
 85 90 95

Lys Lys Thr Ala Thr Gly Glu Val Leu Val Gly Pro Phe Val Gly Asn
 100 105 110

Gly Gln Phe Leu Val Ile Thr Asp Tyr Gly Thr Gly Asn Pro Tyr Asn
 115 120 125

Ser Ile Thr Pro Leu Ile Ser Gly Glu Ile Gly Glu Asp Leu Ala Phe
 130 135 140

Tyr Leu Thr Glu Ser Gln Gln Thr Pro Ser Ala Val Gly Leu Asn Val
 145 150 155 160

00769787 043604

322

Leu Leu Asp Glu Glu Asp Lys Val Lys Val Ala Gly Gly Phe Leu Val
165 170 175

Gln Val Leu Pro Gly Ala Lys Lys Glu Glu Ile Ala Arg Phe Glu Lys
180 185 190

Arg Ile Gln Glu Met Pro Ala Ile Ser Thr Leu Leu Glu Ser Asp Asp
195 200 205

His Ile Glu Ala Leu Leu Lys Ala Ile Tyr Gly Asp Glu Ala Tyr Lys
210 215 220

Arg Leu Ser Glu Glu Glu Ile Arg Phe Gln Cys Asp Cys Ser His Glu
225 230 235 240

Arg Phe Met Asn Ala Leu Ala Ser Leu Pro Ser Ser Asp Leu Gln Glu
245 250 255

Met Lys Glu Glu Asp His Gly Ala Glu Ile Thr Cys Gln Phe Cys Gln
260 265 270

Thr Thr Tyr Asn Phe Asp Glu Lys Asp Leu Glu Glu Leu Ile Arg Asp
275 280 285

Lys Ser
290

<210> 154

<211> 152

<212> PRT

<213> Streptococcus pneumoniae

<400> 154

Met Lys Ser Ile Thr Lys Lys Ile Lys Ala Thr Leu Ala Gly Val Ala

1

5

10

15

00769797.01504

323

Ala Leu Phe Ala Val Phe Ala Pro Ser Phe Val Ser Ala Gln Glu Ser
20 25 30

Ser Thr Tyr Thr Val Lys Glu Gly Asp Thr Leu Ser Glu Ile Ala Glu
35 40 45

Thr His Asn Thr Thr Val Glu Lys Leu Ala Glu Asn Asn His Ile Asp
50 55 60

Asn Ile His Leu Ile Tyr Val Asp Gln Glu Leu Val Ile Asp Gly Pro
65 70 75 80

Val Ala Pro Val Ala Thr Pro Ala Pro Ala Thr Tyr Ala Ala Pro Ala
85 90 95

Ala Gln Asp Glu Thr Val Ser Ala Pro Val Ala Glu Thr Pro Val Val
100 105 110

Ser Glu Thr Val Val Ser Thr Val Ser Gly Ser Glu Ala Glu Ala Lys
115 120 125

Glu Trp Ile Ala Gln Lys Glu Ser Gly Gly Ser Ile Gln Leu Gln Met
130 135 140

Asp Val Ile Ser Asp Val Thr Asn
145 150

<210> 155

<211> 677

<212> PRT

<213> Streptococcus pneumoniae

<400> 155

Met Asn Leu Gly Glu Phe Trp Tyr Asn Lys Ile Asn Lys Asn Arg Gly
1 5 10 15

00769704300

324

Arg Arg Leu Met Lys Lys Val Arg Phe Ile Phe Leu Ala Leu Leu Phe
20 25 30

Phe Leu Ala Ser Pro Glu Gly Ala Met Ala Ser Asp Gly Thr Trp Gln
35 40 45

Gly Lys Gln Tyr Leu Lys Glu Asp Gly Ser Gln Ala Ala Asn Glu Trp
50 55 60

Val Phe Asp Thr His Tyr Gln Ser Trp Phe Tyr Ile Lys Ala Asp Ala
65 70 75 80

Asn Tyr Ala Glu Asn Glu Trp Leu Lys Gln Gly Asp Asp Tyr Phe Tyr
85 90 95

Leu Lys Ser Gly Gly Tyr Met Ala Lys Ser Glu Trp Val Glu Asp Lys
100 105 110

Gly Ala Phe Tyr Tyr Leu Asp Gln Asp Gly Lys Met Lys Arg Asn Ala
115 120 125

Trp Val Gly Thr Ser Tyr Val Gly Ala Thr Gly Ala Lys Val Ile Glu
130 135 140

Asp Trp Val Tyr Asp Ser Gln Tyr Asp Ala Trp Phe Tyr Ile Lys Ala
145 150 155 160

Asp Gly Gln His Ala Glu Lys Glu Trp Leu Gln Ile Lys Gly Lys Asp
165 170 175

Tyr Tyr Phe Lys Ser Gly Gly Tyr Leu Leu Thr Ser Gln Trp Ile Asn
180 185 190

Gln Ala Tyr Val Asn Ala Ser Gly Ala Lys Val Gln Gln Gly Trp Leu
195 200 205

Ph Asp Lys Gln Tyr Gln Ser Trp Phe Tyr Ile Lys Glu Asn Gly Asn
210 215 220

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325

Tyr Ala Asp Lys Glu Trp Ile Phe Glu Asn Gly His Tyr Tyr Tyr Leu
225 230 235 240

Lys Ser Gly Gly Tyr Met Ala Ala Asn Glu Trp Ile Trp Asp Lys Glu
245 250 255

Ser Trp Phe Tyr Leu Lys Phe Asp Gly Lys Met Ala Glu Lys Glu Trp
260 265 270

Val Tyr Asp Ser His Ser Gln Ala Trp Tyr Tyr Phe Lys Ser Gly Gly
275 280 285

Tyr Met Thr Ala Asn Glu Trp Ile Trp Asp Lys Glu Ser Trp Phe Tyr
290 295 300

Leu Lys Ser Asp Gly Lys Ile Ala Glu Lys Glu Trp Val Tyr Asp Ser
305 310 315 320

His Ser Gln Ala Trp Tyr Tyr Phe Lys Ser Gly Gly Tyr Met Thr Ala
325 330 335

Asn Glu Trp Ile Trp Asp Lys Glu Ser Trp Phe Tyr Leu Lys Ser Asp
340 345 350

Gly Lys Ile Ala Glu Lys Glu Trp Val Tyr Asp Ser His Ser Gln Ala
355 360 365

Trp Tyr Tyr Phe Lys Ser Gly Gly Tyr Met Ala Lys Asn Glu Thr Val
370 375 380

Asp Gly Tyr Gln Leu Gly Ser Asp Gly Lys Trp Leu Gly Gly Lys Thr
385 390 395 400

Thr Asn Glu Asn Ala Ala Tyr Tyr Gln Val Val Pro Val Thr Ala Asn
405 410 415

Val Tyr Asp S r Asp Gly Glu Lys Leu Ser Tyr Ile Ser Gln Gly Ser
420 425 430

002603.01501

Val Val Trp Leu Asp Lys Asp Arg Lys Ser Asp Asp Lys Arg Leu Ala
435 440 445

Ile Thr Ile Ser Gly Leu Ser Gly Tyr Met Lys Thr Glu Asp Leu Gln
450 455 460

Ala Leu Asp Ala Ser Lys Asp Phe Ile Pro Tyr Tyr Glu Ser Asp Gly
465 470 475 480

His Arg Phe Tyr His Tyr Val Ala Gln Asn Ala Ser Ile Pro Val Ala
485 490 495

Ser His Leu Ser Asp Met Glu Val Gly Lys Lys Tyr Tyr Ser Ala Asp
500 505 510

Gly Leu His Phe Asp Gly Phe Lys Leu Glu Asn Pro Phe Leu Phe Lys
515 520 525

Asp Leu Thr Glu Ala Thr Asn Tyr Ser Ala Glu Glu Leu Asp Lys Val
530 535 540

Phe Ser Leu Leu Asn Ile Asn Asn Ser Leu Leu Glu Asn Lys Gly Ala
545 550 555 560

Thr Phe Lys Glu Ala Glu Glu His Tyr His Ile Asn Ala Leu Tyr Leu
565 570 575

Leu Ala His Ser Ala Leu Glu Ser Asn Trp Gly Arg Ser Lys Ile Ala
580 585 590

Lys Asp Lys Asn Asn Phe Phe Gly Ile Thr Ala Tyr Asp Thr Thr Pro
595 600 605

Tyr Leu Ser Ala Lys Thr Phe Asp Asp Val Asp Lys Gly Ile Leu Gly
610 615 620

Ala Thr Lys Trp Ile Lys Glu Asn Tyr Ile Asp Arg Gly Arg Thr Phe
625 630 635 640

00360707 045604

327

Leu Gly Asn Lys Ala Ser Gly Met Asn Val Glu Tyr Ala Ser Asp Pro
645 650 655

Tyr Trp Gly Glu Lys Ile Ala Ser Val Met Met Lys Ile Asn Glu Lys
660 665 670

Leu Gly Gly Lys Asp
675

<210> 156

<211> 309

<212> PRT

<213> Streptococcus pneumoniae

<400> 156

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln
50 55 60

Asp Pro His Glu Tyr Glu Pro Leu Pro Glu Asp Val Lys Lys Thr Ser
65 70 75 80

Glu Ala Asn Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn
100 105 110

00760787 042604

328

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu
210 215 220

Ile Asn Thr Glu Glu Glu Gly Thr Pro Glu Gln Ile Lys Thr Leu Val
225 230 235 240

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser
245 250 255

Val Asp Asp Arg Pro Met Lys Thr Val Ser Gln Asp Thr Asn Ile Pro
260 265 270

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala
290 295 300

Glu Gly Leu Ala Lys
305

00760702 042604

<210> 157

<211> 419

<212> PRT

<213> Streptococcus pneumoniae

<400> 157

Met Glu Trp Tyr Lys Lys Ile Gly Leu Leu Ala Thr Thr Gly Leu Ala
 1 5 10 15

Leu Phe Gly Leu Gly Ala Cys Ser Asn Tyr Gly Lys Ser Ala Asp Gly
 20 25 30

Thr Val Thr Ile Glu Tyr Phe Asn Gln Lys Lys Glu Met Thr Lys Thr
 35 40 45

Leu Glu Glu Ile Thr Arg Asp Phe Glu Lys Glu Asn Pro Lys Ile Lys
 50 55 60

Val Lys Val Val Asn Val Pro Asn Ala Gly Glu Val Leu Lys Thr Arg
 65 70 75 80

Val Leu Ala Gly Asp Val Pro Asp Val Val Asn Ile Tyr Pro Gln Ser
 85 90 95

Ile Glu Leu Gln Glu Trp Ala Lys Ala Gly Val Phe Glu Asp Leu Ser
 100 105 110

Asn Lys Asp Tyr Leu Lys Arg Val Lys Asn Gly Tyr Ala Glu Lys Tyr
 115 120 125

Ala Val Asn Glu Lys Val Tyr Asn Val Pro Phe Thr Ala Asn Ala Tyr
 130 135 140

Gly Ile Tyr Tyr Asn Lys Asp Lys Phe Glu Glu Leu Gly Leu Lys Val
 145 150 155 160

00769797 04E604

330

Pro Glu Thr Trp Asp Glu Phe Glu Gln Leu Val Lys Asp Ile Val Ala
165 170 175

Lys Gly Gln Thr Pro Phe Gly Ile Ala Gly Ala Asp Ala Trp Thr Leu
180 185 190

Asn Gly Tyr Asn Gln Leu Ala Phe Ala Thr Ala Thr Gly Gly Gly Lys
195 200 205

Glu Ala Asn Gln Tyr Leu Arg Tyr Ser Gln Pro Asn Ala Ile Lys Leu
210 215 220

Ser Asp Pro Ile Met Lys Asp Asp Ile Lys Val Met Asp Ile Leu Arg
225 230 235 240

Ile Asn Gly Ser Lys Gln Lys Asn Trp Glu Gly Ala Gly Tyr Thr Asp
245 250 255

Val Ile Gly Ala Phe Ala Arg Gly Asp Val Leu Met Thr Pro Asn Gly
260 265 270

Ser Trp Ala Ile Thr Ala Ile Asn Glu Gln Lys Pro Asn Phe Lys Ile
275 280 285

Gly Thr Phe Met Ile Pro Gly Lys Glu Lys Gly Gln Ser Leu Thr Val
290 295 300

Gly Ala Gly Asp Leu Ala Trp Ser Ile Ser Ala Thr Thr Lys His Pro
305 310 315 320

Lys Glu Ala Asn Ala Phe Val Glu Tyr Met Thr Arg Pro Glu Val Met
325 330 335

Gln Lys Tyr Tyr Asp Val Asp Gly Ser Pro Thr Ala Ile Glu Gly Val
340 345 350

Lys Gln Ala Gly Glu Asp Ser Pro Leu Ala Gly Met Thr Glu Tyr Ala
355 360 365

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331

Phe Thr Asp Arg His Leu Val Trp Leu Gln Gln Tyr Trp Thr Ser Glu
370 375 380

Ala Asp Phe His Thr Leu Thr Met Asn Tyr Val Leu Thr Gly Asp Lys
385 390 395 400

Gln Gly Met Val Asn Asp Leu Asn Ala Phe Phe Asn Pro Met Lys Ala
405 410 415

Asp Val Asp

<210> 158

<211> 559

<212> PRT

<213> Streptococcus pneumoniae

<400> 158

Met Lys Lys Ile Lys Pro His Gly Pro Leu Pro Ser Gln Thr Gln Leu
1 5 10 15

Ala Tyr Leu Gly Asp Glu Leu Ala Ala Phe Ile His Phe Gly Pro Asn
20 25 30

Thr Phe Tyr Asp Gln Glu Trp Gly Thr Gly Gln Glu Asp Pro Glu Arg
35 40 45

Phe Asn Pro Ser Gln Leu Asp Ala Arg Glu Trp Val Arg Val Leu Lys
50 55 60

Glu Thr Gly Phe Lys Lys Leu Ile Leu Val Val Lys His His Asp Gly
65 70 75 80

Phe Val Leu Tyr Pro Thr Ala His Thr Asp Tyr Ser Val Lys Val Ser
85 90 95

00769787 012301

Pro Trp Arg Arg Gly Lys Gly Asp Leu Leu Leu Glu Val Ser Gln Ala
 100 105 110

Ala Thr Glu Phe Asp Met Asp Met Gly Val Tyr Leu Ser Pro Trp Asp
 115 120 125

Ala His Ser Pro Leu Tyr His Val Asp Arg Glu Ala Asp Tyr Asn Ala
 130 135 140

Tyr Tyr Leu Ala Gln Leu Lys Glu Ile Leu Ser Asn Pro Asn Tyr Gly
 145 150 155 160

Asn Ala Gly Lys Phe Ala Glu Val Trp Met Asp Gly Ala Arg Gly Glu
 165 170 175

Gly Ala Gln Lys Val Asn Tyr Glu Phe Glu Lys Trp Phe Glu Thr Ile
 180 185 190

Arg Asp Leu Gln Gly Asp Cys Leu Ile Phe Ser Thr Glu Gly Thr Ser
 195 200 205

Ile Arg Trp Ile Gly Asn Glu Arg Gly Tyr Ala Gly Asp Pro Leu Trp
 210 215 220

Gln Lys Val Asn Pro Asp Lys Leu Gly Thr Glu Ala Glu Leu Asn Tyr
 225 230 235 240

Leu Gln His Gly Asp Pro Ser Gly Thr Ile Phe Ser Ile Gly Glu Ala
 245 250 255

Asp Val Ser Ile Arg Pro Gly Trp Phe Tyr His Glu Asp Gln Asp Pro
 260 265 270

Lys Ser Leu Glu Glu Leu Val Glu Ile Tyr Phe His Ser Val Gly Arg
 275 280 285

Gly Thr Pro Leu Leu Leu Asn Ile Pro Pro Asn Gln Ala Gly Leu Phe
 290 295 300

00360703 01504

333

Asp Ala Lys Asp Ile Glu Arg Leu Tyr Glu Phe Ala Thr Tyr Arg Asn
305 310 315 320

Glu Leu Tyr Lys Glu Asp Leu Ala Leu Gly Ala Glu Val Ser Gly Pro
325 330 335

Ala Leu Ser Ala Asp Phe Ala Cys Arg His Leu Thr Asp Gly Leu Glu
340 345 350

Thr Ser Ser Trp Ala Ser Asp Ala Asp Leu Pro Ile Gln Leu Glu Leu
355 360 365

Asp Leu Gly Ser Pro Lys Thr Phe Asp Val Ile Glu Leu Arg Glu Asp
370 375 380

Leu Lys Leu Gly Gln Arg Ile Ala Ala Phe His Val Gln Val Glu Val
385 390 395 400

Asp Gly Val Trp Gln Glu Phe Gly Ser Gly His Thr Val Gly Tyr Lys
405 410 415

Arg Leu Leu Arg Gly Ala Val Val Glu Ala Gln Lys Ile Arg Val Val
420 425 430

Ile Thr Glu Ser Gln Ala Leu Pro Leu Leu Thr Lys Ile Ser Leu Tyr
435 440 445

Lys Thr Pro Gly Leu Ser Lys Lys Glu Val Val Gln Glu Leu Ala Phe
450 455 460

Ala Glu Lys Ser Leu Ala Val Ala Lys Gly Glu Asn Ala Tyr Phe Thr
465 470 475 480

Val Lys Arg Arg Glu Cys Ser Gly Pro Leu Glu Ala Lys Ile Ser Ile
485 490 495

Gln Pro Gly Thr Gly Val His Gly Val Ala Tyr Gln Asp Glu Ile Gln
500 505 510

00760707 013501

Val Leu Ala Phe Gln Thr Gly Glu Thr Glu Lys Ser Leu Thr Leu Pro
 515 520 525

Thr Leu Tyr Phe Ala Gly Asp Lys Thr Leu Asp Phe Tyr Leu Asn Leu
 530 535 540

Thr Val Asp Gly Gln Leu Val Asp Gln Leu Gln Val Gln Val Ser
 545 550 555

<210> 159

<211> 227

<212> PRT

<213> Streptococcus pneumoniae

<400> 159

Met Leu Glu Arg Leu Lys Arg Ile His Tyr Met Phe Trp Ile Ser Leu
 1 5 10 15

Ile Phe Met Ile Phe Pro Ile Leu Ser Val Val Thr Gly Trp Leu Ser
 20 25 30

Ala Trp His Leu Leu Ile Asp Ile Leu Phe Val Val Ala Tyr Leu Gly
 35 40 45

Val Leu Thr Thr Lys Ser Gln Arg Leu Ser Trp Leu Tyr Trp Gly Leu
 50 55 60

Met Leu Thr Tyr Val Val Gly Asn Thr Ala Phe Val Ala Val Asn Tyr
 65 70 75 80

Ile Trp Phe Phe Phe Phe Leu Ser Asn Leu Leu Ser Tyr His Phe Ser
 85 90 95

Val Arg Ser Leu Lys Ser Leu His Val Trp Thr Phe Leu Leu Ala Gln
 100 105 110

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335

Val Leu Val Val Gly Gln Leu Leu Ile Phe Gln Arg Ile Glu Val Glu
115 120 125

Phe Leu Phe Tyr Leu Leu Val Ile Leu Thr Phe Val Asp Leu Met Thr
130 135 140

Phe Gly Leu Val Arg Ile Arg Ile Val Glu Asp Leu Lys Glu Ala Gln
145 150 155 160

Val Lys Gln Asn Ala Gln Ile Asn Leu Leu Leu Ala Glu Asn Glu Arg
165 170 175

Ser Arg Ile Gly Gln Asp Leu His Asp Ser Leu Gly His Thr Phe Ala
180 185 190

Met Leu Ser Val Lys Thr Asp Leu Ala Leu Gln Leu Phe Gln Met Glu
195 200 205

Ala Tyr Pro Gln Val Glu Lys Glu Leu Lys Glu Ile His Gln Ile Ser
210 215 220

Lys Asp Pro
225

<210> 160

<211> 370

<212> PRT

<213> Streptococcus pneumoniae

<400> 160

Met Asn Asp Lys Leu Lys Ile Phe Leu Leu Leu Gly Val Phe Phe Leu
1 5 10 15

Ala Ile Thr Gly Phe Tyr Val Leu Leu Ile Arg Asn Ala Gly Gln Thr
20 25 30

00769787 012501

336

Asp Ala Ser Gln Ile Glu Lys Ala Ala Val Ser Gln Gly Gly Lys Ala
35 40 45

Val Lys Lys Thr Glu Ile Ser Lys Asp Ala Asp Leu His Glu Ile Tyr
50 55 60

Leu Ala Gly Gly Cys Phe Trp Gly Val Glu Glu Tyr Phe Ser Arg Val
65 70 75 80

Pro Gly Val Thr Asp Ala Val Ser Gly Tyr Ala Asn Gly Arg Gly Glu
85 90 95

Thr Thr Lys Tyr Glu Leu Ile Asn Gln Thr Gly His Ala Glu Thr Val
100 105 110

His Val Thr Tyr Asp Ala Lys Gln Ile Ser Leu Lys Glu Ile Leu Leu
115 120 125

His Tyr Phe Arg Ile Ile Asn Pro Thr Ser Lys Asn Lys Gln Gly Asn
130 135 140

Asp Val Gly Thr Gln Tyr Arg Thr Gly Val Tyr Tyr Thr Asp Asp Lys
145 150 155 160

Asp Leu Glu Val Ile Asn Gln Val Phe Asp Glu Val Ala Lys Lys Tyr
165 170 175

Asp Gln Pro Leu Ala Val Glu Lys Glu Asn Leu Lys Asn Phe Val Val
180 185 190

Ala Glu Asp Tyr His Gln Asp Tyr Leu Lys Lys Asn Pro Asn Gly Tyr
195 200 205

Cys His Ile Asn Val Asn Gln Ala Ala Tyr Pro Val Ile Asp Ala Ser
210 215 220

Lys Tyr Pro Lys Pro Ser Asp Glu Glu Leu Lys Lys Thr Leu Ser Pro
225 230 235 240

00760707 042604

337

Glu Glu Tyr Ala Val Thr Gln Glu Asn Gln Thr Glu Arg Ala Phe Ser
245 250 255

Asn Arg Tyr Trp Asp Lys Phe Glu Ser Gly Ile Tyr Val Asp Ile Ala
260 265 270

Thr Gly Glu Pro Leu Phe Ser Ser Lys Asp Lys Phe Glu Ser Gly Cys
275 280 285

Gly Trp Pro Ser Phe Thr Gln Pro Ile Ser Pro Asp Val Val Thr Tyr
290 295 300

Lys Glu Asp Lys Ser Tyr Asn Met Thr Arg Met Glu Val Arg Ser Arg
305 310 315 320

Val Gly Asp Ser His Leu Gly His Val Phe Thr Asp Gly Pro Gln Asp
325 330 335

Lys Gly Gly Leu Arg Tyr Cys Ile Asn Ser Leu Ser Ile Arg Phe Ile
340 345 350

Pro Lys Asp Gln Met Glu Glu Lys Gly Tyr Ala Tyr Leu Leu Asp Tyr
355 360 365

Val Asp
370

<210> 161

<211> 338

<212> PRT

<213> Streptococcus pneumoniae

<400> 161

Met Lys Lys Lys Trp Met Tyr Tyr Ala Ala Cys Ser Ser Asn Glu Ser

1

5

10

15

00269787 043604

338

Ala Asp Asp Ser Ser Ser Asp Lys Gly Asp Gly Gly Ser Leu Val Val
20 25 30

Tyr Ser Pro Asn Ser Glu Gly Leu Ile Gly Ala Thr Ile Pro Ala Phe
35 40 45

Glu Glu Lys Tyr Gly Ile Lys Val Glu Leu Ile Gln Ala Gly Thr Gly
50 55 60

Glu Leu Phe Lys Lys Leu Glu Ser Glu Lys Glu Val Pro Val Ala Asp
65 70 75 80

Val Ile Phe Gly Gly Ser Tyr Thr Gln Tyr Thr Thr His Gly Glu Leu
85 90 95

Phe Glu Asn Tyr Thr Ser Lys Glu Asn Asp Asn Val Ile Lys Glu Tyr
100 105 110

Gln Asn Thr Thr Gly Tyr Ser Thr Pro Tyr Thr Leu Asp Gly Ser Val
115 120 125

Leu Ile Val Asn Pro Asp Leu Thr Lys Gly Met Asn Ile Glu Gly Tyr
130 135 140

Asn Asp Leu Phe Lys Pro Glu Leu Lys Gly Lys Ile Ala Thr Ala Asp
145 150 155 160

Pro Ala Asn Ser Ser Ser Ala Phe Ala Gln Leu Thr Asn Met Leu Gln
165 170 175

Ala Gln Gly Gly Tyr Lys Asp Asp Lys Ala Trp Ser Tyr Val Lys Asp
180 185 190

Leu Phe Thr Leu Ile Asp Gly Lys Ile Gly Ser Ser Ser Ser Ser Val
195 200 205

Tyr Lys Val Val Ala Asp Gly Glu Met Ala Val Gly Leu Ser Tyr Glu
210 215 220

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[illegible]

Pro Val Ile Glu Asn Leu Asn Ile Thr Ile Pro Lys Gly Ser Leu Phe
20 25 30

[illegible]

Pro Ala Asn Glu Phe Val Ala Thr Phe Ile Gly Arg Thr Asn Ile Ile
225 230 235 240

341

Pro Ala Asn Leu Glu Lys Arg Ser Asp Gly Ala Tyr Ile Val Phe Ser
245 250 255

Asp Gly Tyr Ala Leu Arg Met Pro Ala Leu Asp Gln Val Glu Glu Gln
260 265 270

Ala Ile His Val Ser Ile Arg Pro Glu Glu Phe Ile Lys Asp Glu Ser
275 280 285

Gly Asp Ile Glu Gly Thr Ile Arg Asp Ser Val Tyr Leu Gly Leu Asn
290 295 300

Thr Asp Tyr Phe Ile Glu Thr Gly Phe Ala Ser Lys Ile Gln Val Ser
305 310 315 320

Glu Glu Ser Thr Phe Glu Glu Asp Leu Gln Lys Gly Asn Arg Ile Arg
325 330 335

Leu Arg Ile Asn Thr Gln Lys Leu Asn Ile Phe Ser Ala Asp Gly Ser
340 345 350

Gln Asn Leu Ile Lys Gly Val Asn His Gly Thr
355 360

<210> 163

<211> 313

<212> PRT

<213> Streptococcus pneumoniae

<400> 163

Met Lys Lys Lys Leu Leu Ala Gly Ala Ile Thr Leu Leu Ser Val Ala
1 5 10 15

Thr Leu Ala Ala Cys Ser Lys Gly Ser Glu Gly Ala Asp Leu Ile Ser
20 25 30

00760707 042504

Met Lys Gly Asp Val Ile Thr Glu His Gln Phe Tyr Glu Gln Val Lys
 35 40 45

Ser Asn Pro Ser Ala Gln Gln Val Leu Leu Asn Met Thr Ile Gln Lys
 50 55 60

Val Phe Glu Lys Gln Tyr Gly Ser Glu Leu Asp Asp Lys Glu Val Asp
 65 70 75 80

Asp Thr Ile Ala Glu Glu Lys Lys Gln Tyr Gly Glu Asn Tyr Gln Arg
 85 90 95

Val Leu Ser Gln Ala Gly Met Thr Leu Glu Thr Arg Lys Ala Gln Ile
 100 105 110

Arg Thr Ser Lys Leu Val Glu Leu Ala Val Lys Lys Val Ala Glu Ala
 115 120 125

Glu Leu Thr Asp Glu Ala Tyr Lys Lys Ala Phe Asp Glu Tyr Thr Pro
 130 135 140

Asp Val Thr Ala Gln Ile Ile Arg Leu Asn Asn Glu Asp Lys Ala Lys
 145 150 155 160

Glu Val Leu Glu Lys Ala Lys Ala Glu Gly Ala Asp Phe Ala Gln Leu
 165 170 175

Ala Lys Asp Asn Ser Thr Asp Glu Lys Thr Lys Glu Asn Gly Gly Glu
 180 185 190

Ile Thr Phe Asp Ser Ala Ser Thr Glu Val Pro Glu Gln Val Lys Lys
 195 200 205

Ala Ala Phe Ala Leu Asp Val Asp Gly Val Ser Asp Val Ile Thr Ala
 210 215 220

Thr Gly Thr Gln Ala Tyr Ser Ser Gln Tyr Tyr Ile Val Lys Leu Thr
 225 230 235 240

00963707 043504

343

Lys Lys Thr Glu Lys Ser Ser Asn Ile Asp Asp Tyr Lys Glu Lys Leu
245 250 255

Lys Thr Val Ile Leu Thr Gln Lys Gln Asn Asp Ser Thr Phe Val Gln
260 265 270

Ser Ile Ile Gly Lys Glu Leu Gln Ala Ala Asn Ile Lys Val Lys Asp
275 280 285

Gln Ala Phe Gln Asn Ile Phe Thr Gln Tyr Ile Gly Gly Gly Asp Ser
290 295 300

Ser Ser Ser Ser Ser Thr Ser Asn Glu
305 310

<210> 164

<211> 465

<212> PRT

<213> Streptococcus pneumoniae

<400> 164

Met Lys Lys Asn Ile Lys Gln Tyr Val Thr Leu Gly Thr Val Val Val
1 5 10 15

Leu Ser Ala Phe Val Ala Asn Ser Val Ala Ala Gln Glu Thr Glu Thr
20 25 30

Ser Glu Val Ser Thr Pro Lys Leu Val Gln Pro Val Ala Pro Thr Thr
35 40 45

Pro Ile Ser Glu Val Gln Pro Thr Ser Asp Asn Ser Ser Glu Val Thr
50 55 60

Val Gln Pro Arg Thr Val Glu Thr Thr Val Lys Asp Pro Ser Ser Thr
65 70 75 80

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344

Ala Glu Glu Thr Pro Val Leu Glu Lys Asn Asn Val Thr Leu Thr Gly
85 90 95

Gly Gly Glu Asn Val Thr Lys Glu Leu Lys Asp Lys Phe Thr Ser Gly
100 105 110

Asp Phe Thr Val Val Ile Lys Tyr Asn Gln Ser Ser Glu Lys Gly Leu
115 120 125

Gln Ala Leu Phe Gly Ile Ser Asn Ser Lys Pro Gly Gln Gln Asn Ser
130 135 140

Tyr Val Asp Val Phe Leu Arg Asp Asn Gly Glu Leu Gly Met Glu Ala
145 150 155 160

Arg Asp Thr Ser Ser Asn Lys Asn Asn Leu Val Ser Arg Pro Ala Ser
165 170 175

Val Trp Gly Lys Tyr Lys Gln Glu Ala Val Thr Asn Thr Val Ala Val
180 185 190

Val Ala Asp Ser Val Lys Lys Thr Tyr Ser Leu Tyr Ala Asn Gly Thr
195 200 205

Lys Val Val Glu Lys Lys Val Asp Asn Phe Leu Asn Ile Lys Asp Ile
210 215 220

Lys Gly Ile Asp Tyr Tyr Met Leu Gly Gly Val Lys Arg Ala Gly Lys
225 230 235 240

Thr Ala Phe Gly Phe Asn Gly Thr Leu Glu Asn Ile Lys Phe Phe Asn
245 250 255

Ser Ala Leu Asp Glu Glu Thr Val Lys Lys Met Thr Thr Asn Ala Val
260 265 270

Thr Gly His Leu Ile Tyr Thr Ala Asn Asp Thr Thr Gly Ser Asn Tyr
275 280 285

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345

Phe Arg Ile Pro Val Leu Tyr Thr Phe Ser Asn Gly Arg Val Phe Ser
290 295 300

Ser Ile Asp Ala Arg Tyr Gly Gly Thr His Asp Phe Leu Asn Lys Ile
305 310 315 320

Asn Ile Ala Thr Ser Tyr Ser Asp Asp Asn Gly Lys Thr Trp Thr Lys
325 330 335

Pro Lys Leu Thr Leu Ala Phe Asp Asp Phe Ala Pro Val Pro Leu Glu
340 345 350

Trp Pro Arg Glu Val Gly Gly Arg Asp Leu Gln Ile Ser Gly Gly Ala
355 360 365

Thr Tyr Ile Asp Ser Val Ile Val Glu Lys Lys Asn Lys Gln Val Leu
370 375 380

Met Phe Ala Asp Val Met Pro Ala Gly Val Ser Phe Arg Glu Ala Thr
385 390 395 400

Arg Lys Asp Ser Gly Tyr Lys Gln Ile Asp Gly Asn Tyr Tyr Leu Lys
405 410 415

Leu Arg Lys Gln Gly Asp Thr Asp Tyr Asn Tyr Thr Ile Arg Glu Asn
420 425 430

Gly Thr Val Tyr Asp Asp Arg Thr Asn Arg Pro Thr Glu Phe Ser Val
435 440 445

Asp Lys Asn Phe Gly Ile Lys Gln Asn Gly Asn Tyr Leu Thr Val Glu
450 455 460

Arg
465

00769767.04504

<210> 165

<211> 266

<212> PRT

<213> Streptococcus pneumoniae

<400> 165

Met Lys Lys Phe Ser Leu Leu Leu Ala Ile Leu Pro Phe Leu Val Ala

1

5

10

15

Cys Glu Asn Gln Ala Thr Pro Lys Glu Thr Ser Ala Gln Lys Thr Ile

20

25

30

Val Leu Ala Thr Ala Gly Asp Val Pro Pro Phe Asp Tyr Glu Asp Lys

35

40

45

Gly Asn Leu Thr Gly Phe Asp Ile Glu Val Leu Lys Ala Val Asp Glu

50

55

60

Lys Leu Ser Asp Tyr Glu Ile Gln Phe Gln Arg Thr Ala Trp Glu Ser

65

70

75

80

Ile Phe Pro Gly Leu Asp Ser Gly His Tyr Gln Ala Ala Ala Asn Asn

85

90

95

Leu Ser Tyr Thr Lys Glu Arg Ala Glu Lys Tyr Leu Tyr Ser Leu Pro

100

105

110

Ile Ser Asn Asn Pro Leu Val Leu Val Ser Asn Lys Lys Asn Pro Leu

115

120

125

Thr Ser Leu Asp Gln Ile Ala Gly Lys Thr Thr Gln Glu Asp Thr Gly

130

135

140

Thr Ser Asn Ala Gln Phe Ile Asn Asn Trp Asn Gln Lys His Thr Asp

145

150

155

160

Asn Pro Ala Thr Il Asn Phe Ser Gly Glu Asp Ile Gly Lys Arg Ile

165

170

175

09769797.043604

347

Leu Asp Leu Ala Asn Gly Glu Phe Asp Phe Leu Val Phe Asp Lys Val
180 185 190

Ser Val Gln Lys Ile Ile Lys Asp Arg Gly Leu Asp Leu Ser Val Val
195 200 205

Asp Leu Pro Ser Ala Asp Ser Pro Ser Asn Tyr Ile Ile Phe Ser Ser
210 215 220

Asp Gln Lys Glu Phe Lys Glu Gln Phe Asp Lys Ala Leu Lys Glu Leu
225 230 235 240

Tyr Gln Asp Gly Thr Leu Glu Lys Leu Ser Asn Thr Tyr Leu Gly Gly
245 250 255

Ser Tyr Leu Pro Asp Gln Ser Gln Leu Gln
260 265

<210> 166

<211> 259

<212> PRT

<213> Streptococcus pneumoniae

<400> 166

Met Lys Lys Asn Ser Leu Tyr Ile Ile Ser Ser Leu Phe Phe Ala Cys
1 5 10 15

Val Leu Phe Val Tyr Ala Thr Ala Thr Asn Phe Gln Asn Ser Thr Ser
20 25 30

Ala Arg Gln Val Lys Thr Glu Thr Tyr Thr Asn Thr Val Thr Asn Val
35 40 45

Pro Ile Asp Il Arg Tyr Asn Ser Asp Lys Tyr Phe Ile Ser Gly Phe
50 55 60

0096979.01360

Ala Ser Glu Val Ser Val Val Leu Thr Gly Ala Asn Arg Leu Ser Leu
65 70 75 80

Ala Ser Glu Met Gln Glu Ser Thr Arg Lys Phe Lys Val Thr Ala Asp
85 90 95

Leu Thr Asp Ala Gly Val Gly Thr Ile Glu Val Pro Leu Ser Ile Glu
100 105 110

Asp Leu Pro Asn Gly Leu Thr Ala Val Ala Thr Pro Gln Lys Ile Thr
115 120 125

Val Lys Ile Gly Lys Lys Ala Gln Lys Asp Lys Val Lys Ile Val Pro
130 135 140

Glu Ile Asp Pro Ser Gln Ile Asp Ser Arg Val Gln Ile Glu Asn Val
145 150 155 160

Met Val Ser Asp Lys Glu Val Ser Ile Thr Ser Asp Gln Glu Thr Leu
165 170 175

Asp Arg Ile Asp Lys Ile Ile Ala Val Leu Pro Thr Ser Glu Arg Ile
180 185 190

Thr Gly Asn Tyr Ser Gly Ser Val Pro Leu Gln Ala Ile Asp Arg Asn
195 200 205

Gly Val Val Leu Pro Ala Val Ile Thr Pro Phe Asp Thr Ile Met Lys
210 215 220

Val Thr Thr Lys Pro Val Ala Pro Ser Ser Ser Thr Ser Asn Ser Ser
225 230 235 240

Thr Ser Ser Ser Ser Glu Thr Ser Ser Ser Thr Lys Ala Thr Ser Ser
245 250 255

Lys Thr Asn

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<210> 167

<211> 263

<212> PRT

<213> Streptococcus pneumoniae

<400> 167

Met Leu Ile Gly Glu Gly Tyr Arg Thr Phe Pro Val Leu Ile Tyr Thr
 1 5 10 15

Gln Phe Ile Ser Glu Val Gly Gly Asn Ser Ala Phe Ala Ile Met Ala
 20 25 30

Ile Ile Ile Ala Leu Ala Ile Phe Leu Ile Gln Lys His Ile Ala Asn
 35 40 45

Arg Tyr Ser Phe Ser Met Asn Leu Leu His Pro Ile Glu Pro Lys Lys
 50 55 60

Thr Thr Lys Gly Lys Met Ala Ala Ile Tyr Ala Thr Val Tyr Gly Ile
 65 70 75 80

Ile Phe Ile Ser Val Leu Pro Gln Ile Tyr Leu Ile Tyr Thr Ser Phe
 85 90 95

Leu Lys Thr Ser Gly Met Val Ser Val Lys Gly Tyr Ser Pro Asn Ser
 100 105 110

Tyr Lys Val Ala Phe His Arg Met Gly Ser Ala Ile Phe Asn Thr Ile
 115 120 125

Arg Ile Pro Leu Ile Ala Leu Val Leu Val Val Leu Phe Ala Thr Phe
 130 135 140

Ile Ser Tyr Leu Ala Val Arg Lys Arg Asn Leu Phe Thr Asn Leu Ile
 145 150 155 160

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350

Asp Ser Leu Ser Met Val Pro Tyr Ile Val Pro Gly Thr Val Leu Gly
165 170 175

Ile Ala Phe Ile Ser Ser Phe Asn Thr Gly Leu Phe Gly Ser Gly Phe
180 185 190

Leu Met Ile Thr Gly Thr Ala Phe Ile Leu Ile Met Ser Leu Ser Ala
195 200 205

Arg Arg Leu Pro Tyr Thr Ile Arg Ser Ser Val Ala Ser Leu Gln Gln
210 215 220

Ile Ala Pro Ser Ile Glu Glu Ala Ala Glu Ser Leu Gly Ser Ser Arg
225 230 235 240

Leu Asn Thr Phe Ala Lys Ile Thr Thr Pro Met Met Leu Ser Gly Ile
245 250 255

Ile Ser Gly Ala Ile Leu Ser
260

<210> 168

<211> 1332

<212> DNA

<213> Streptococcus pneumoniae

<400> 168

atgataaaaa atcctaaatt attaaccaag tcttttttaa gaagttttgc aattctaggt 60
ggtgttggtc tagtcattca tatagctatt tatttgacct ttccttttta ttatattcaa 120
ctggaggggg aaaagttaa tgagagcgca agagtgttta cggagtattt aaagactaag 180
acatctgatg aaattccaag cttactccag tcttattcaa agtccttgac catatctgct 240
caccttaaaa gagatattgt agataagcgg ctccctcttg tgcattgactt ggatattaaa 300
gatggaaagc tatcaaatta tatcgtgatg ttagatatgt ctgttagtac agcagatggg 360
aaacaggtaa ccgtgcaatt tgttcacggg gtggatgtct acaaagaagc aaagaatatt 420
ttgcttttgt atctcccata tacatttttg gttacaattg ctttttcctt tgttttttct 480
tatttttata ctaaagcgtt gctcaatcct cttttttaca tttcagaagt gactagtaaa 540

atgcaagatt tggatgacaa tattcggttt gatgaaagta ggaaagatga agttggtgaa 600
 gttggaaaac agattaatgg tatgtatgag cacttggtga aggttattta tgagttggaa 660
 agtcgtaatg agcaaattgt aaaattgcaa aatcaaaagg tttcctttgt ccgcggagca 720
 tcacatgagt tgaaaacccc tttagccagt cttagaatta tcctagagaa tatgcagcat 780
 aatattggag attacaaaga tcatccaaaa tatattgcaa agagtataaa taagattgac 840
 cagatgagcc acttattaga agaagtactg gagtcttcta aattccaaga gtggacagag 900
 tgtcgtgaga ccttgactgt taagccagtt ttagtagata ttttatcacg ttatcaagaa 960
 ttagctcatt caataggtgt tacaattgaa aatcaattga cagatgctac cagggtcgtc 1020
 atgagtotta gggcattgga taagggtttg acaaacctga ttagtaatgc aattaaatat 1080
 tcagataaaa atgggcgtgt aatcatatcc gagcaagatg gctatctctc tatcaaaaat 1140
 acatgtgctg ctctaagtga ccaagaacta gaacatttat ttgatataatt ctatcattct 1200
 caaatcgtga cagataagga tgaaagttcc ggtttgggtc tttacattgt gaataatatt 1260
 ttagaaaagct atcaaatgga ttatagtttt ctcccttatg aacacggtat ggaatttaag 1320
 attagcttgt ag 1332

<210> 169

<211> 873

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 169

atggataaaa ttattaaaac tatatcagaa agcggagcct ttcgtgcttt tgccttgat 60
 agcaactgaaa ccgtccgcac tgctcaagaa aaacatcaaa cccaagctag ctcaactgta 120
 gcgcttggtc gaactcttat cgctagccag attctcgag ccaatgaaaa aggaaatacc 180
 aaacttacag ttaaggtgtt gggatctagc tctctaggtg ctattatcac cgctcgctgat 240
 accaagggga acgtcaaagg ctatgttcaa aatcctggtg ttgacatcaa aaagactgcg 300
 actggtgaag tcctagtcgg accttttgtt ggaaatggtc aattcctcgt tatcacagac 360
 tacgggtactg gaaatcctta caactctata actccctca tctctggaga aatcgggtgaa 420
 gaccttgctt tttaccttac tgaaagccaa caaacgcctt cagcggtcgg cctcaatgtc 480
 cttttggacg aggaagacaa ggtcaagggt gcagggtggt tcctagttca agtcttgcca 540
 ggagccaaga aagaagagat tgctcgcttt gaaaaacgca tccaagaaat gccagctatc 600
 tctactcttc tcgaaagcga cgaccatata gaagccctcc tcaaggctat ctacggggac 660
 gaagcctaca agcgtctttc tgaagaagaa atccggttcc aatgtgactg tagccatgaa 720
 cgctttatga acgctcttgc cagccttcca agctcagact tacaggaaat gaaagaggaa 780
 gaccacgggg cagaaatcac ttgtcaattc tgccaaacta cttacaactt tgatgaaaag 840
 gacctggagg aactcattcg tgacaaatct taa 873

09769787.04269260

<210> 170

<211> 459

<212> DNA

<213> Streptococcus pneumoniae

<400> 170

atgaaatcaa taactaaaaa gattaaagca actcttgag gagtagctgc cttgtttgca 60
gtatttgctc catcatttgt atctgctcaa gaatcatcaa cttacactgt taaagaaggt 120
gatacacttt cagaaatcgc tgaaactcac aacacaacag ttgaaaaatt ggcagaaaac 180
aaccacattg ataacattca tttgatttat gttgatcaag agttgggttat cgatggccct 240
gtagcgctg ttgcaacacc agcgccagct acttatgcgg caccagccgc tcaagatgaa 300
actgtttcag ctccagtagc agaaactcca gtagtaagt aaacagttgt ttcaactgta 360
agcggatctg aagcagaagc caaagaatgg atcgctcaaa aagaatcagg tggtagtata 420
cagctacaaa tggacgttat atcggacgtt accaattaa 459

<210> 171

<211> 2034

<212> DNA

<213> Streptococcus pneumoniae

<400> 171

atgaatttag gagaattttg gtacaataaa ataaataaga acagaggaag aagggttaatg 60
aagaaagtaa gatttatttt tttagctctg ctatttttct tagctagtcc agaggggtgca 120
atggctagtg atgggtacttg gcaaggaaaa cagtatctga aagaagatgg cagtcaagca 180
gcaaagttagt ggggtttttga tactcattat caatcttggt tctatataaa agcagatgct 240
aactatgctg aaaatgaatg gctaaagcaa ggtgacgact atttttacct caaatctggt 300
ggctatatgg ccaaatacaga atgggtagaa gacaaggag ccttttatta tcttgaccaa 360
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 ggaatttttag gtgcaaccaa gtggattaag gaaaattata tcgatagggg aagaactttc 1920
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<210> 172

<211> 930

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 172

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 atcatcgctg atattactaa aaatattgct ggtgacaaaa ttgaccttca tagtatcggt 180
 ccgattgggc aagaccacaa cgaatacgaa ccacttctcg aagacgttaa gaaaacttct 240
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<210> 173

<211> 1260

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 173

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<210> 174

<211> 1680

<212> DNA

<213> Streptococcus pneumoniae

<400> 174

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 ggaaagggcg acttgctcct tgaagtatcc caagctgcc aagagtttga tatggatatg 360
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<210> 175

<211> 684

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 175

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 gccttgcaat tatttcagat ggaggcttat ccacaggtgg aaaaggaatt aaaagaaatt 660
 caccagatca gcaaggatcc atga 684

<210> 176

<211> 1113

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 176

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 gcagttagcc aaggaggaaa agcagtgaaa aaaacagaaa ttagtaaaga cgcagacttg 180
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 ctcaagaaaa atccaaatgg ctactgccat atcaatgtta atcaggcggc ctatcctgtc 660
 attgatgccg gcaaatatcc aaaaccaagt gatgaggaat tgaaaaagac cctgtcacct 720

09759797.043594

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 ggctacgctt atttactaga ttatgttgat taa 1113

<210> 177

<211> 1017

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 177

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 gctgggtactg gagaactttt caaaaaacta gagtcagaaa aagaagttcc ttagactgat 240
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00769787 04504

<210> 178

<211> 1092

<212> DNA

<213> Streptococcus pneumoniae

<400> 178

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 gggaaaacga cccttcttcg tatgattgca ggtttcaaca gtatcgaagg tggagaattt 180
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 tcagaccaa ttgctgttat gaaagatggg gtgatccaac aaatcggccg accaaaagaa 660
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 gaagaatcaa cttttgaaga agatctacaa aaaggcaatc gtattcgtct acgaatcaat 1020
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<210> 179

<211> 942

<212> DNA

<213> Streptococcus pneumoniae

<400> 179

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 tgttcgaaag ggtcagaagg tgcagacctt atcagcatga aaggggatgt cattacagaa 120
 catcaatttt atgagcaagt gaaaagcaac ccttcagccc aacaagtctt gttaaatatg 180
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<210> 180

<211> 1395

<212> DNA

<213> Streptococcus pneumoniae

<400> 180

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<210> 181

<211> 801

<212> DNA

<213> Streptococcus pneumoniae

<400> 181

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 ccaccatttg actacgaaga caagggcaat ctgacaggct ttgatatcga agtttttaaag 180
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 tatcaagacg gaacccttga aaaactcagc aatacctatc taggtggttc ttacctcca 780
 gatcaatctc agttacaata a 801

<210> 182

<211> 780

<212> DNA

<213> Streptococcus pneumoniae

<400> 182

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 tatactaata cagtaacaaa tgccctatt gacatacgtc ataatagtga taagtatttt 180

09769797 013601

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 aagattatcg ctgttttgcc aactagcgaa cgtataacag gtaattacag tggttcagta 600
 cctttgcagg caatcgaccg caatggtgtt gtcttaccgg cagttatcac tccgtttgat 660
 acaataatga aggtgactac aaaaccagta gcaccaagtt caagcacatc aaattcaagt 720
 acaagcagtt catcgagac atcttcgtca acgaaagcaa ctagttcaaa aacgaattaa 780

<210> 183

<211> 792

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 183

atgttgattg gcgaagggtta tcggactttc cctgtcctga tttataccca atttattaga 60
 gaggttgag gaaattctgc ttttgcaatt atggcgatta tcattgcctt ggcaattttc 120
 cttatccaaa aacacattgc aaaccgctac agtttcagca tgaatctgct ccatccaatt 180
 gagcctaaaa aaactacaaa aggaaaaatg gctgccattt atgcaacagt ctacggaatt 240
 atctttatct ctgttttacc tcaaattctac ttaatttata cctctttcct aaaaacatca 300
 ggtatggtat ctgttaaagg ttattctcca aacagttaca aggtagcttt ccatcgatg 360
 ggatctgcta ttttcaatac cattcgatc cctttgattg ccttagttct agttgttcta 420
 tttgcgacat ttatctccta cctagccgtt agaaaacgga atttgtttac aaacttaatt 480
 gacagcctca gtatggtacc ttatattgta ccaggaaccg ttctagggat tgccttcatt 540
 tcttccttca atactggtct atttggaagt ggatttctta tgattacagg gactgcttcc 600
 atcttgatta tgtctctatc tgccagaaga ttaccttata ctattcgctc atctgttgct 660
 agcttacaac aaatagcacc aagtattgaa gaagctgctg aaagcttagg aagtagtcgt 720
 ctcaatacct ttgctaagat tacaactcca atgatgctat ctggtatcat ttctggagcc 780
 atcttatctt ga 792

<210> 184

<211> 744

<212> PRT

<213> Streptococcus pneumoniae

<400> 184

Met Asn Lys Lys Lys Met Ile Leu Thr Ser Leu Ala Ser Val Ala Ile

1 5 10 15

Leu Gly Ala Gly Phe Val Thr Ser Gln Pro Thr Phe Val Arg Ala Glu

20 25 30

Glu Ser Pro Gln Val Val Glu Lys Ser Ser Leu Glu Lys Lys Tyr Glu

35 40 45

Glu Ala Lys Ala Lys Ala Asp Thr Ala Lys Lys Asp Tyr Glu Thr Ala

50 55 60

Lys Lys Lys Ala Glu Asp Ala Gln Lys Lys Tyr Glu Asp Asp Gln Lys

65 70 75 80

Arg Thr Glu Glu Lys Ala Arg Lys Glu Ala Glu Ala Ser Gln Lys Leu

85 90 95

Asn Asp Val Ala Leu Val Val Gln Asn Ala Tyr Lys Glu Tyr Arg Glu

100 105 110

Val Gln Asn Gln Arg Ser Lys Tyr Lys Ser Asp Ala Glu Tyr Gln Lys

115 120 125

Lys Leu Thr Glu Val Asp Ser Lys Ile Glu Lys Ala Arg Lys Glu Gln

130 135 140

Gln Asp Leu Gln Asn Lys Phe Asn Glu Val Arg Ala Val Val Val Pro

145 150 155 160

Glu Pro Asn Ala Leu Ala Glu Thr Lys Lys Lys Ala Glu Glu Ala Lys

165 170 175

003693 03693

Glu Leu Asp Lys Glu Ala Glu Glu Ala Glu Leu Asp Lys Lys Ala Asp
370 375 380

[illegible]

Tyr Leu Glu Ala Ser Gly Ala Met Lys Ala Ser Gln Trp Phe Lys Val
580 585 590

項目	1990年	1991年	1992年	1993年	1994年	1995年	1996年	1997年	1998年	1999年	2000年	2001年	2002年	2003年	2004年	2005年	2006年	2007年	2008年	2009年	2010年	2011年	2012年	2013年	2014年	2015年	2016年	2017年	2018年	2019年	2020年	2021年	2022年	2023年	2024年	2025年	2026年	2027年	2028年	2029年	2030年	2031年	2032年	2033年	2034年	2035年	2036年	2037年	2038年	2039年	2040年	2041年	2042年	2043年	2044年	2045年	2046年	2047年	2048年	2049年	2050年	2051年	2052年	2053年	2054年	2055年	2056年	2057年	2058年	2059年	2060年	2061年	2062年	2063年	2064年	2065年	2066年	2067年	2068年	2069年	2070年	2071年	2072年	2073年	2074年	2075年	2076年	2077年	2078年	2079年	2080年	2081年	2082年	2083年	2084年	2085年	2086年	2087年	2088年	2089年	2090年	2091年	2092年	2093年	2094年	2095年	2096年	2097年	2098年	2099年	2100年																																																								
人口	120,000,000	121,000,000	122,000,000	123,000,000	124,000,000	125,000,000	126,000,000	127,000,000	128,000,000	129,000,000	130,000,000	131,000,000	132,000,000	133,000,000	134,000,000	135,000,000	136,000,000	137,000,000	138,000,000	139,000,000	140,000,000	141,000,000	142,000,000	143,000,000	144,000,000	145,000,000	146,000,000	147,000,000	148,000,000	149,000,000	150,000,000	151,000,000	152,000,000	153,000,000	154,000,000	155,000,000	156,000,000	157,000,000	158,000,000	159,000,000	160,000,000	161,000,000	162,000,000	163,000,000	164,000,000	165,000,000	166,000,000	167,000,000	168,000,000	169,000,000	170,000,000	171,000,000	172,000,000	173,000,000	174,000,000	175,000,000	176,000,000	177,000,000	178,000,000	179,000,000	180,000,000	181,000,000	182,000,000	183,000,000	184,000,000	185,000,000	186,000,000	187,000,000	188,000,000	189,000,000	190,000,000	191,000,000	192,000,000	193,000,000	194,000,000	195,000,000	196,000,000	197,000,000	198,000,000	199,000,000	200,000,000	201,000,000	202,000,000	203,000,000	204,000,000	205,000,000	206,000,000	207,000,000	208,000,000	209,000,000	210,000,000	211,000,000	212,000,000	213,000,000	214,000,000	215,000,000	216,000,000	217,000,000	218,000,000	219,000,000	220,000,000	221,000,000	222,000,000	223,000,000	224,000,000	225,000,000	226,000,000	227,000,000	228,000,000	229,000,000	230,000,000	231,000,000	232,000,000	233,000,000	234,000,000	235,000,000	236,000,000	237,000,000	238,000,000	239,000,000	240,000,000	241,000,000	242,000,000	243,000,000	244,000,000	245,000,000	246,000,000	247,000,000	248,000,000	249,000,000	250,000,000	251,000,000	252,000,000	253,000,000	254,000,000	255,000,000	256,000,000	257,000,000	258,000,000	259,000,000	260,000,000	261,000,000	262,000,000	263,000,000	264,000,000	265,000,000	266,000,000	267,000,000	268,000,000	269,000,000	270,000,000	271,000,000	272,000,000	273,000,000	274,000,000	275,000,000	276,000,000	277,000,000	278,000,000	279,000,000	280,000,000	281,000,000	282,000,000	283,000,000	284,000,000	285,000,000	286,000,000

15

Phe Ser Val Gly Val Ala Ser Val Val Val Ala Ser Leu Val Met Gly
20 25 30

Ser Val Val His Ala Thr Glu Asn Glu Gly Ala Thr Gln Val Pro Thr
35 40 45

Ser Ser Asn Arg Ala Asn Glu Ser Gln Ala Glu Gln Gly Glu Gln Pro
50 55 60

Lys Lys Leu Asp Ser Glu Arg Asp Lys Ala Arg Lys Glu Val Glu Glu
65 70 75 80

Tyr Val Lys Lys Ile Val Gly Glu Ser Tyr Ala Lys Ser Thr Lys Lys
85 90 95

Arg His Thr Ile Thr Val Ala Leu Val Asn Glu Leu Asn Asn Ile Lys
100 105 110

Asn Glu Tyr Leu Asn Lys Ile Val Glu Ser Thr Ser Glu Ser Gln Leu
115 120 125

Gln Ile Leu Met Met Glu Ser Arg Ser Lys Val Asp Glu Ala Val Ser
130 135 140

Lys Phe Glu Lys Asp Ser Ser Ser Ser Ser Ser Ser Asp Ser Ser Thr
145 150 155 160

Lys Pro Glu Ala Ser Asp Thr Ala Lys Pro Asn Lys Pro Thr Glu Pro
165 170 175

Gly Glu Lys Val Ala Glu Ala Lys Lys Lys Val Glu Glu Ala Glu Lys
180 185 190

Lys Ala Lys Asp Gln Lys Glu Glu Asp Arg Arg Asn Tyr Pro Thr Ile
195 200 205

Thr Tyr Lys Thr Leu Glu Leu Glu Ile Ala Glu Ser Asp Val Glu Val
210 215 220

105610-25263260

Figure 1 consists of 12 histograms arranged in a single row. Each histogram represents the distribution of the number of non-zero elements in the vector x for a specific value of n , ranging from 10 to 120 in increments of 10. The x-axis for all histograms is labeled 'x' and ranges from 0 to 120. The y-axis is labeled 'count' and ranges from 0 to 100. As n increases, the distribution of x becomes more concentrated around zero, with the peak count increasing significantly. For $n=10$, the distribution is broad and low, with a peak count of approximately 10. For $n=120$, the distribution is very narrow and tall, with a peak count of approximately 100.

Lys Ile Lys Thr Asp Arg Lys Lys Ala Glu Glu Glu Ala Lys Arg Lys
420 425 430

Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp Val Lys Asp
625 630 635 640

369

Gly Asp Thr Trp Tyr Tyr Leu Glu Ala Ser Gly Ala Met Lys Ala Ser
645 650 655

Gln Trp Phe Lys Val Ser Asp Lys Trp Tyr Tyr Val Asn Gly Ser Gly
660 665 670

Ala Leu Ala Val Asn Thr Thr Val Asp Gly Tyr Gly Val Asn Ala Asn
675 680 685

Gly Glu Trp Val Asn
690

<210> 186

<211> 129

<212> PRT

<213> Streptococcus pneumoniae

<400> 186

Met Val Lys Arg Arg Ile Arg Arg Gly Thr Arg Glu Pro Glu Lys Val
1 5 10 15

Val Val Pro Glu Gln Ser Ser Ile Pro Ser Tyr Pro Val Ser Val Thr
20 25 30

Ser Asn Gln Gly Thr Asp Val Ala Val Glu Pro Ala Lys Ala Val Ala
35 40 45

Pro Thr Thr Asp Trp Lys Gln Glu Asn Gly Met Trp Tyr Phe Tyr Asn
50 55 60

Thr Asp Gly Ser Met Ala Thr Gly Trp Val Gln Val Asn Ser Ser Trp
65 70 75 80

Tyr Tyr Leu Asn Ser Asn Gly Ser Met Lys Val Asn Gln Trp Phe Gln
85 90 95

370

Val Gly Gly Lys Trp Tyr Tyr Val Asn Thr Ser Gly Glu Leu Ala Val
100 105 110

Asn Thr Ser Ile Asp Gly Tyr Arg Val Asn Asp Asn Gly Glu Trp Val
115 120 125

Arg

<210> 187

<211> 230

<212> PRT

<213> Streptococcus pneumoniae

<400> 187

Leu Asn Thr Ser Phe Val His Ala Ala Asp Gly Ile Gln Tyr Val Arg
1 5 10 15

Asp Asp Thr Arg Asp Lys Glu Glu Gly Ile Glu Tyr Asp Asp Ala Asp
20 25 30

Asn Gly Asp Ile Ile Val Lys Val Ala Thr Lys Pro Lys Val Val Thr
35 40 45

Lys Lys Ile Ser Ser Thr Arg Ile Arg Tyr Glu Lys Asp Glu Thr Lys
50 55 60

Asp Arg Ser Glu Asn Pro Val Thr Ile Asp Gly Glu Asp Gly Tyr Val
65 70 75 80

Thr Thr Thr Arg Thr Tyr Asp Val Asn Pro Glu Thr Gly Tyr Val Thr
85 90 95

Glu Gln Val Thr Val Asp Arg Lys Glu Ala Thr Asp Thr Val Ile Lys
100 105 110

09769787 043604

371

Val Pro Ala Lys Ser Lys Val Glu Glu Val Leu Val Pro Phe Ala Thr
115 120 125

Lys Tyr Glu Ala Asp Asn Asp Leu Ser Ala Gly Gln Glu Gln Glu Ile
130 135 140

Thr Leu Gly Lys Asn Gly Lys Thr Val Thr Thr Ile Thr Tyr Asn Val
145 150 155 160

Asp Gly Lys Ser Gly Gln Val Thr Glu Ser Thr Leu Ser Gln Lys Lys
165 170 175

Asp Ser Gln Thr Arg Val Val Lys Lys Arg Thr Lys Pro Gln Val Leu
180 185 190

Val Gln Glu Ile Pro Ile Glu Thr Glu Tyr Leu Asp Gly Pro Thr Leu
195 200 205

Asp Lys Ser Gln Glu Val Glu Glu Val Gly Glu Ile Gly Lys Leu Leu
210 215 220

Leu Leu Gln Ser Ile Leu
225 230

<210> 188

<211> 340

<212> PRT

<213> Streptococcus pneumoniae

<400> 188

Met Lys Leu Leu Lys Lys Met Met Gln Ile Ala Leu Ala Thr Phe Phe
1 5 10 15

Phe Gly Leu Leu Ala Thr Asn Thr Val Phe Ala Asp Asp Ser Glu Gly
20 25 30

Trp Gln Phe Val Gln Glu Asn Gly Arg Thr Tyr Tyr Lys Lys Gly Asp
35 40 45

Leu Lys Glu Thr Tyr Trp Arg Val Ile Asp Gly Lys Tyr Tyr Tyr Phe
50 55 60

Asp Pro Leu Ser Gly Glu Met Val Val Gly Trp Gln Tyr Ile Pro Ala
65 70 75 80

Pro His Lys Gly Val Thr Ile Gly Pro Ser Pro Arg Ile Glu Ile Ala
85 90 95

Leu Arg Pro Asp Trp Phe Tyr Phe Gly Gln Asp Gly Val Leu Gln Glu
100 105 110

Phe Val Gly Lys Gln Val Leu Glu Ala Lys Thr Ala Thr Asn Thr Asn
115 120 125

Lys His His Gly Glu Glu Tyr Asp Ser Gln Ala Glu Lys Arg Val Tyr
130 135 140

Tyr Phe Glu Asp Gln Arg Ser Tyr His Thr Leu Lys Thr Gly Trp Ile
145 150 155 160

Tyr Glu Glu Gly His Trp Tyr Tyr Leu Gln Lys Asp Gly Gly Phe Asp
165 170 175

Ser Arg Ile Asn Arg Leu Thr Val Gly Glu Leu Ala Arg Gly Trp Val
180 185 190

Lys Asp Tyr Pro Leu Thr Tyr Asp Glu Glu Lys Leu Lys Ala Ala Pro
195 200 205

Trp Tyr Tyr Leu Asn Pro Ala Thr Gly Ile Met Gln Thr Gly Trp Gln
210 215 220

Tyr Leu Gly Asn Arg Trp Tyr Tyr Leu His Ser Ser Gly Ala Met Ala
225 230 235 240

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373

Thr Gly Trp Tyr Lys Glu Gly Ser Thr Trp Tyr Tyr Leu Asp Ala Glu
245 250 255

Asn Gly Asp Met Arg Thr Gly Trp Gln Asn Leu Gly Asn Lys Trp Tyr
260 265 270

Tyr Leu Arg Ser Ser Gly Ala Met Ala Thr Gly Trp Tyr Gln Glu Ser
275 280 285

Ser Thr Trp Tyr Tyr Leu Asn Ala Ser Asn Gly Asp Met Lys Thr Gly
290 295 300

Trp Phe Gln Val Asn Gly Asn Trp Tyr Tyr Ala Tyr Asp Ser Gly Ala
305 310 315 320

Leu Ala Val Asn Thr Thr Val Gly Gly Tyr Tyr Leu Asn Tyr Asn Gly
325 330 335

Glu Trp Val Lys
340

<210> 189

<211> 181

<212> PRT

<213> Streptococcus pneumoniae

<400> 189

Leu Ala Gly Arg Tyr Gly Ser Ala Val Gln Cys Thr Glu Val Thr Ala
1 5 10 15

Ser Asn Leu Ser Thr Val Lys Thr Lys Ala Thr Val Val Glu Lys Pro
20 25 30

Leu Lys Asp Phe Arg Ala Ser Thr Ser Asp Gln Ser Gly Trp Val Glu
35 40 45

00369797-012604

374

Ser Asn Gly Lys Trp Tyr Phe Tyr Glu Ser Gly Asp Val Lys Thr Gly
50 55 60

Trp Val Lys Thr Asp Gly Lys Trp Tyr Tyr Leu Asn Asp Leu Gly Val
65 70 75 80

Met Gln Thr Gly Phe Val Lys Phe Ser Gly Ser Trp Tyr Tyr Leu Ser
85 90 95

Asn Ser Gly Ala Met Phe Thr Gly Trp Gly Thr Asp Gly Ser Arg Trp
100 105 110

Phe Tyr Phe Asp Gly Ser Gly Ala Met Lys Thr Gly Trp Tyr Lys Glu
115 120 125

Asn Gly Thr Trp Tyr Tyr Leu Asp Glu Ala Gly Ile Met Lys Thr Gly
130 135 140

Trp Phe Lys Val Gly Pro His Trp Tyr Tyr Ala Tyr Gly Ser Gly Ala
145 150 155 160

Leu Ala Val Ser Thr Thr Thr Pro Asp Gly Tyr Arg Val Asn Gly Asn
165 170 175

Gly Glu Trp Val Asn
180

<210> 190

<211> 332

<212> PRT

<213> Streptococcus pneumoniae

<400> 190

Met Lys Ile Leu Lys Lys Thr Met Gln Val Gly Leu Thr Val Phe Phe
1 5 10 15

[illegible]

Gly Ile Met Gln Thr Gly Trp Gln Tyr Leu Gly Asn Lys Trp Tyr Tyr
210 215 220

[illegible]

Ile His Phe Ile Asn Val Gln Glu Gly Gly Ser Asp Ala Ile Ile Leu
35 40 45

Glu Ser Asn Gly His Phe Ala Met Val Asp Thr Gly Glu Asp Tyr Asp
50 55 60

Phe Pro Asp Gly Ser Asp Ser Arg Tyr Pro Trp Arg Glu Gly Ile Glu
65 70 75 80

Thr Ser Tyr Lys His Val Leu Thr Asp Arg Val Phe Arg Arg Leu Lys
85 90 95

Glu Leu Gly Val Gln Lys Leu Asp Phe Ile Leu Val Thr His Thr His
100 105 110

Ser Asp His Ile Gly Asn Val Asp Glu Leu Leu Ser Thr Tyr Pro Val
115 120 125

Asp Arg Val Tyr Leu Lys Lys Tyr Ser Asp Ser Arg Ile Thr Asn Ser
130 135 140

Glu Arg Leu Trp Asp Asn Leu Tyr Gly Tyr Asp Lys Val Leu Gln Thr
145 150 155 160

Ala Ala Glu Lys Gly Val Ser Val Ile Gln Asn Ile Thr Gln Gly Asp
165 170 175

Ala His Phe Gln Phe Gly Asp Met Asp Ile Gln Leu Tyr Asn Tyr Glu
180 185 190

Asn Glu Thr Asp Ser Ser Gly Glu Leu Lys Lys Ile Trp Asp Asp Asn
195 200 205

Ser Asn Ser Leu Ile Ser Val Val Lys Val Asn Gly Lys Lys Ile Tyr
210 215 220

Leu Gly Gly Asp Leu Asp Asn Val His Gly Ala Glu Asp Lys Tyr Gly
225 230 235 240

Pro Leu Ile Gly Lys Val Asp Leu Met Lys Phe Asn His His His Asp
245 250 255

103210 636360

Gln Trp Tyr Tyr Phe Ala Pro Ser Gly Glu Met Lys Met Gly Trp Val
450 455 460

Ser Glu Gln
625

<210> 192

<211> 318

<212> PRT

<213> Streptococcus pneumoniae

<400> 192

Met Glu Ile Asn Val Ser Lys Leu Arg Thr Asp Leu Pro Gln Val Gly

1 5 10 15

Val Gln Pro Tyr Arg Gln Val His Ala His Ser Thr Gly Asn Pro His

20 25 30

Ser Thr Val Gln Asn Glu Ala Asp Tyr His Trp Arg Lys Asp Pro Glu

35 40 45

Leu Gly Phe Phe Ser His Ile Val Gly Asn Gly Cys Ile Met Gln Val

50 55 60

Gly Pro Val Asp Asn Gly Ala Trp Asp Val Gly Gly Gly Trp Asn Ala

65 70 75 80

Glu Thr Tyr Ala Ala Val Glu Leu Ile Glu Ser His Ser Thr Lys Glu

85 90 95

Glu Phe Met Thr Asp Tyr Arg Leu Tyr Ile Glu Leu Leu Arg Asn Leu

100 105 110

Ala Asp Glu Ala Gly Leu Pro Lys Thr Leu Asp Thr Gly Ser Leu Ala

115 120 125

Gly Ile Lys Thr His Glu Tyr Cys Thr Asn Asn Gln Pro Asn Asn His

130 135 140

Ser Asp His Val Asp Pro Tyr Pro Tyr Leu Ala Lys Trp Gly Ile Ser

145 150 155 160

Arg Glu Gln Phe Lys His Asp Ile Glu Asn Gly Leu Thr Ile Glu Thr

165 170 175

005510 26269260

381

Gly Trp Gln Lys Asn Asp Thr Gly Tyr Trp Tyr Val His Ser Asp Gly
180 185 190

Ser Tyr Pro Lys Asp Lys Phe Glu Lys Ile Asn Gly Thr Trp Tyr Tyr
195 200 205

Phe Asp Ser Ser Gly Tyr Met Leu Ala Asp Arg Trp Arg Lys His Thr
210 215 220

Asp Gly Asn Trp Tyr Trp Phe Asp Asn Ser Gly Glu Met Ala Thr Gly
225 230 235 240

Trp Lys Lys Ile Ala Asp Lys Trp Tyr Tyr Phe Asn Glu Glu Gly Ala
245 250 255

Met Lys Thr Gly Trp Val Lys Tyr Lys Asp Thr Trp Tyr Tyr Leu Asp
260 265 270

Ala Lys Glu Gly Ala Met Val Ser Asn Ala Phe Ile Gln Ser Ala Asp
275 280 285

Gly Thr Gly Trp Tyr Tyr Leu Lys Pro Asp Gly Thr Leu Ala Asp Lys
290 295 300

Pro Glu Phe Thr Val Glu Pro Asp Gly Leu Ile Thr Val Lys
305 310 315

<210> 193

<211> 513

<212> PRT

<213> Streptococcus pneumoniae

<400> 193

Met Gly Thr Thr Gly Phe Thr Ile Ile Asp Leu Ile Ile Leu Ile Val
1 5 10 15

Tyr Leu Leu Ala Val Leu Val Ala Gly Ile Tyr Phe Ser Lys Lys Glu
 20 25 30

Met Lys Gly Lys Glu Phe Phe Lys Gly Asp Gly Ser Val Pro Trp Tyr
 35 40 45

Val Thr Ser Val Ser Ile Phe Ala Thr Met Leu Ser Pro Ile Ser Phe
 50 55 60

Leu Gly Leu Ala Gly Ser Ser Tyr Ala Gly Ser Trp Ile Leu Trp Phe
 65 70 75 80

Ala Gln Leu Gly Met Val Val Ala Ile Pro Leu Thr Ile Arg Phe Ile
 85 90 95

Leu Pro Ile Phe Ala Arg Ile Asp Ile Asp Thr Ala Tyr Asp Tyr Leu
 100 105 110

Asp Lys Arg Phe Asn Ser Lys Ala Leu Arg Ile Ile Ser Ala Leu Leu
 115 120 125

Phe Ile Ile Tyr Gln Leu Gly Arg Met Ser Ile Ile Met Tyr Leu Pro
 130 135 140

Ser Ala Gly Leu Ser Val Leu Thr Gly Ile Asp Ile Asn Ile Leu Ile
 145 150 155 160

Ile Leu Met Gly Val Val Ala Ile Val Tyr Ser Tyr Thr Gly Gly Leu
 165 170 175

Lys Ser Val Leu Trp Thr Asp Phe Ile Gln Gly Val Ile Leu Ile Ser
 180 185 190

Gly Val Val Leu Ala Leu Phe Val Leu Ile Ala Asn Ile Lys Gly Gly
 195 200 205

Phe Gly Ala Val Ala Glu Thr Leu Ala Asn Gly Lys Phe Leu Ala Ala
 210 215 220

105610 232600

383

Asn Glu Lys Leu Phe Asp Pro Asn Leu Leu Ser Asn Ser Ile Phe Leu
225 230 235 240

Ile Val Met Gly Ser Gly Phe Thr Ile Leu Ser Ser Tyr Ala Ser Ser
245 250 255

Gln Asp Leu Val Gln Arg Phe Thr Thr Thr Gln Asn Ile Lys Lys Leu
260 265 270

Asn Lys Met Leu Phe Thr Asn Gly Val Leu Ser Leu Ala Thr Ala Thr
275 280 285

Val Phe Tyr Leu Ile Gly Thr Gly Leu Tyr Val Phe Tyr Gln Val Gln
290 295 300

Asn Ala Asp Ser Ala Ala Ser Asn Ile Pro Gln Asp Gln Ile Phe Met
305 310 315 320

Tyr Phe Ile Ala Tyr Gln Leu Pro Val Gly Ile Thr Gly Leu Ile Leu
325 330 335

Ala Ala Ile Tyr Ala Ala Ser Gln Ser Thr Ile Ser Thr Gly Leu Asn
340 345 350

Ser Val Ala Thr Ser Trp Thr Leu Asp Ile Gln Asp Val Ile Ser Lys
355 360 365

Asn Met Ser Asp Asn Arg Arg Thr Lys Ile Ala Gln Phe Val Ser Leu
370 375 380

Ala Val Gly Leu Phe Ser Ile Gly Val Ser Ile Val Met Ala His Ser
385 390 395 400

Asp Ile Lys Ser Ala Tyr Glu Trp Phe Asn Ser Phe Met Gly Leu Val
405 410 415

Leu Gly Leu Leu Gly Gly Val Phe Ile Leu Gly Phe Val Ser Lys Lys
420 425 430

105210 232660

384

Ala Asn Lys Gln Gly Ala Tyr Ala Ala Leu Ile Val Ser Thr Ile Val
435 440 445

Met Val Phe Ile Lys Tyr Phe Leu Pro Pro Thr Ala Val Ser Tyr Trp
450 455 460

Ala Tyr Ser Leu Ile Ser Ile Ser Val Ser Val Val Ser Gly Tyr Ile
465 470 475 480

Val Ser Val Leu Thr Gly Asn Lys Val Ser Ala Pro Lys Tyr Thr Thr
485 490 495

Ile His Asp Ile Thr Glu Ile Lys Ala Asp Ser Ser Trp Glu Val Arg
500 505 510

His

<210> 194

<211> 826

<212> PRT

<213> Streptococcus pneumoniae

<400> 194

Met Lys Ile Asn Lys Lys Tyr Leu Ala Gly Ser Val Ala Val Leu Ala
1 5 10 15

Leu Ser Val Cys Ser Tyr Glu Leu Gly Arg His Gln Ala Gly Gln Asp
20 25 30

Lys Lys Glu Ser Asn Arg Val Ala Tyr Ile Asp Gly Asp Gln Ala Gly
35 40 45

Gln Lys Ala Glu Asn Leu Thr Pro Asp Glu Val Ser Lys Arg Glu Gly
50 55 60

385

Ile Asn Ala Glu Gln Ile Val Ile Lys Ile Thr Asp Gln Gly Tyr Val
65 70 75 80

Thr Ser His Gly Asp His Tyr His Tyr Tyr Asn Gly Lys Val Pro Tyr
85 90 95

Asp Ala Ile Ile Ser Glu Glu Leu Leu Met Lys Asp Pro Asn Tyr Gln
100 105 110

Leu Lys Asp Ser Asp Ile Val Asn Glu Ile Lys Gly Gly Tyr Val Ile
115 120 125

Lys Val Asp Gly Lys Tyr Tyr Val Tyr Leu Lys Asp Ala Ala His Ala
130 135 140

Asp Asn Ile Arg Thr Lys Glu Glu Ile Lys Arg Gln Lys Gln Glu Arg
145 150 155 160

Ser His Asn His Gly Ser Gly Ala Asn Asp His Ala Val Ala Ala Ala
165 170 175

Arg Ala Gln Gly Arg Tyr Thr Thr Asp Asp Gly Tyr Ile Phe Asn Ala
180 185 190

Ser Asp Ile Ile Glu Asp Thr Gly Asp Ala Tyr Ile Val Pro His Gly
195 200 205

Asp His Tyr His Tyr Ile Pro Lys Asn Glu Leu Ser Ala Ser Glu Leu
210 215 220

Ala Ala Ala Glu Ala Tyr Trp Asn Gly Lys Gln Gly Ser Arg Pro Ser
225 230 235 240

Ser Ser Ser Ser Tyr Asn Ala Asn Pro Ala Gln Pro Arg Leu Ser Glu
245 250 255

Asn His Asn Leu Thr Val Thr Pro Thr Tyr His Gln Asn Gln Gly Glu
260 265 270

103210 252560

386

Asn Ile Ser Ser Leu Leu Arg Glu Leu Tyr Ala Lys Pro Leu Ser Glu
275 280 285

Arg His Val Glu Ser Asp Gly Leu Ile Phe Asp Pro Ala Gln Ile Thr
290 295 300

Ser Arg Thr Ala Arg Gly Val Ala Val Pro His Gly Asn His Tyr His
305 310 315 320

Phe Ile Pro Tyr Glu Gln Met Ser Glu Leu Glu Lys Arg Ile Ala Arg
325 330 335

Ile Ile Pro Leu Arg Tyr Arg Ser Asn His Trp Val Pro Asp Ser Arg
340 345 350

Pro Glu Gln Pro Ser Pro Gln Ser Thr Pro Glu Pro Ser Pro Ser Pro
355 360 365

Gln Pro Ala Pro Asn Pro Gln Pro Ala Pro Ser Asn Pro Ile Asp Glu
370 375 380

Lys Leu Val Lys Glu Ala Val Arg Lys Val Gly Asp Gly Tyr Val Phe
385 390 395 400

Glu Glu Asn Gly Val Ser Arg Tyr Ile Pro Ala Lys Asp Leu Ser Ala
405 410 415

Glu Thr Ala Ala Gly Ile Asp Ser Lys Leu Ala Lys Gln Glu Ser Leu
420 425 430

Ser His Lys Leu Gly Ala Lys Lys Thr Asp Leu Pro Ser Ser Asp Arg
435 440 445

Glu Phe Tyr Asn Lys Ala Tyr Asp Leu Leu Ala Arg Ile His Gln Asp
450 455 460

Leu Leu Asp Asn Lys Gly Arg Gln Val Asp Phe Glu Ala Leu Asp Asn
465 470 475 480

103210 13203200

Leu Leu Glu Arg Leu Lys Asp Val Pro Ser Asp Lys Val Lys Leu Val
 485 490 495

Asp Asp Ile Leu Ala Phe Leu Ala Pro Ile Arg His Pro Glu Arg Leu
 500 505 510

Gly Lys Pro Asn Ala Gln Ile Thr Tyr Thr Asp Asp Glu Ile Gln Val
 515 520 525

Ala Lys Leu Ala Gly Lys Tyr Thr Thr Glu Asp Gly Tyr Ile Phe Asp
 530 535 540

Pro Arg Asp Ile Thr Ser Asp Glu Gly Asp Ala Tyr Val Thr Pro His
 545 550 555 560

Met Thr His Ser His Trp Ile Lys Lys Asp Ser Leu Ser Glu Ala Glu
 565 570 575

Arg Ala Ala Ala Gln Ala Tyr Ala Lys Glu Lys Gly Leu Thr Pro Pro
 580 585 590

Ser Thr Asp His Gln Asp Ser Gly Asn Thr Glu Ala Lys Gly Ala Glu
 595 600 605

Ala Ile Tyr Asn Arg Val Lys Ala Ala Lys Lys Val Pro Leu Asp Arg
 610 615 620

Met Pro Tyr Asn Leu Gln Tyr Thr Val Glu Val Lys Asn Gly Ser Leu
 625 630 635 640

Ile Ile Pro His Tyr Asp His Tyr His Asn Ile Lys Phe Glu Trp Phe
 645 650 655

Asp Glu Gly Leu Tyr Glu Ala Pro Lys Gly Tyr Thr Leu Glu Asp Leu
 660 665 670

Leu Ala Thr Val Lys Tyr Tyr Val Glu His Pro Asn Glu Arg Pro His
 675 680 685

105210 656360

388

Ser Asp Asn Gly Phe Gly Asn Ala Ser Asp His Val Gln Arg Asn Lys
690 695 700

Asn Gly Gln Ala Asp Thr Asn Gln Thr Glu Lys Pro Ser Glu Glu Lys
705 710 715 720

Pro Gln Thr Glu Lys Pro Glu Glu Glu Thr Pro Arg Glu Glu Lys Pro
725 730 735

Gln Ser Glu Lys Pro Glu Ser Pro Lys Pro Thr Glu Glu Pro Glu Glu
740 745 750

Ser Pro Glu Glu Ser Glu Glu Pro Gln Val Glu Thr Glu Lys Val Glu
755 760 765

Glu Lys Leu Arg Glu Ala Glu Asp Leu Leu Gly Lys Ile Gln Asp Pro
770 775 780

Ile Ile Lys Ser Asn Ala Lys Glu Thr Leu Thr Gly Leu Lys Asn Asn
785 790 795 800

Leu Leu Phe Gly Thr Gln Asp Asn Asn Thr Ile Met Ala Glu Ala Glu
805 810 815

Lys Leu Leu Ala Leu Leu Lys Glu Ser Lys
820 825

<210> 195

<211> 295

<212> PRT

<213> Streptococcus pneumoniae

<400> 195

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105670 68269260

Lys Leu Ser Lys Leu Thr Thr Pro Ile Leu Gln Gln Gln Val Asn Lys
 20 25 30

Trp Ala Asp Lys Ala Asn Lys Gly Glu Lys Gly Ala Phe Ala Asn Tyr
 35 40 45

Ser Leu Leu His Asn Met Asn Lys Arg Ile Leu Lys Tyr Gly Val Ala
 50 55 60

Ile Gln Val Ile Gln Tyr Asn Pro Ala Asn Asp Val Ile Val Pro Arg
 65 70 75 80

Lys Gln Gln Lys Glu Lys Ala Ala Val Lys Tyr Leu Asp Asn Lys Glu
 85 90 95

Leu Lys Gln Phe Leu Asp Tyr Leu Asp Ala Leu Asp Gln Ser Asn Tyr
 100 105 110

Glu Asn Leu Phe Asp Val Val Leu Tyr Lys Thr Leu Leu Ala Thr Gly
 115 120 125

Cys Arg Ile Ser Glu Ala Leu Ala Leu Glu Trp Ser Asp Ile Asp Leu
 130 135 140

Glu Ser Gly Val Ile Ser Ile Asn Lys Thr Leu Asn Arg Tyr Gln Glu
 145 150 155 160

Ile Asn Ser Pro Lys Ser Ser Ala Gly Tyr Arg Asp Ile Pro Ile Asp
 165 170 175

Lys Ala Thr Leu Leu Leu Lys Gln Tyr Lys Asn Arg Gln Gln Ile
 180 185 190

Gln Ser Trp Lys Leu Gly Arg Ser Glu Thr Val Val Phe Ser Val Phe
 195 200 205

Thr Glu Lys Tyr Ala Tyr Ala Cys Asn Leu Arg Lys Arg Leu Asn Lys
 210 215 220

005692660

390

His Phe Asp Ala Ala Gly Val Thr Asn Val Ser Phe His Gly Phe Arg
225 230 235 240

His Thr His Thr Thr Met Met Leu Tyr Ala Gln Val Ser Pro Lys Asp
245 250 255

Val Gln Tyr Arg Leu Gly His Ser Asn Leu Met Ile Thr Glu Asn Thr
260 265 270

Tyr Trp His Thr Asn Gln Glu Asn Ala Lys Lys Ala Val Ser Asn Tyr
275 280 285

Glu Thr Ala Ile Asn Asn Leu
290 295

<210> 196

<211> 2235

<212> DNA

<213> Streptococcus pneumoniae

<400> 196

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tcttcattag agaagaaata tgaggaagca aaagcaaaag ctgatactgc caagaaagat 180
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 ggtgaatggg tttaa 2235

<210> 197

<211> 2082

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 197

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 gaatcaacct cagaaagcca actacagata ctgatgatgg agagtcgata aaaagtagat 420

gaagctgtgt ctaagtttga aaaggactca tcttcttcgt caagttcaga ctcttccact 480
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 gcagaagcta agaagaaggt tgaagaagct gagaaaaaag ccaaggatca aaaagaagaa 600
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 gatgtggaag ttaaaaaagc ggagcttgaa ctagtaaaaag tgaaagctaa cgaacctcga 720
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 gtatcagata aatgggtacta tgtcaatggc tcaggtgccc ttgcagtcaa cacaactgta 2040
 gatggctatg gagtcaatgc caatggtgaa tgggtaaact aa 2082

<210> 198

<211> 390

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 198

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 caatcatcta ttccttcgta tcctgtatct gttacatcta accaaggaac agatgtagca 120

gtagaaccag ctaaagcagt tgctccaaca acagactgga aacaagaaaa tggatatgtgg 180
 tatttttata atactgatgg ttccatggca acaggttggg tacaagttaa tagttcatgg 240
 tactacctca acagcaacgg ttctatgaaa gtcaatcaat ggttccaagt tggtggtaaa 300
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 gtcaatgata atggtgaatg ggtgcgttaa 390

<210> 199

<211> 693

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 199

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 gcgaactaaac ctaaggtagt aaccaagaaa atttcaagta cgcgaattcg ttatgaaaaa 180
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 gaagttcttg ttccatttgc tactaaatat gaagcagaca atgacctttc tgcaggacag 420
 gagcaagaga ttactctagg aaagaatggg aaaacagtta caacgataac ttataatgta 480
 gatggaaaga gtggacaagt aactgagagt actttaagtc aaaaaaaga ctctcaaaca 540
 agagttgtta aaaaaagaac caagcccaa gttcttgtcc aagaaattcc aatcgaaaca 600
 gaatatctcg atggcccaac tcttgataaa agtcaagaag tagaagaagt aggagaaatt 660
 ggtaaattac tcttactaca atctatactg tag 693

<210> 200

<211> 1023

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 200

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 agaacctact acaaaaagg g gatctaaaa gaaacctact ggagagtgat agatgggaag 180
 tactattatt ttgatccttt atccggagag atggttgtcg gctggcaata tatacctgct 240
 ccacacaagg gggttacgat tggctccttct ccaagaatag agattgctct tagaccagat 300

tggtttttatt ttggtcaaga tgggtgtatta caagaatttg ttggcaagca agtttttagaa 360
 gcaaaaactg ctacgaatac caacaaacat catggggaag aatatgatag ccaagcagag 420
 aaacgagtct attattttga agatcagcgt agttatcata ctttaaaaac tggttggatt 480
 tatgaagagg gtcattggta ttatttacag aaggatgggtg gctttgattc gcgcacatcaac 540
 agattgacgg ttggagagct agcacgtggt ttgggttaagg attaccctct tacgtatgat 600
 gaagagaagc taaaagcagc tccatggtac tatctaaatc cagcaactgg cattatgcaa 660
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<210> 201

<211> 546

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 201

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 tctgatcagt ctgggtgggt ggaatctaata ggtaaatggt atttctatga gtctgggtgat 180
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 atgaagacag gttggtttta agtcggacca cactggtact atgcctacgg ttcaggagct 480
 ttggctgtga gcacaacaac accagatggt taccgtgtaa atggtaatgg tgaatgggta 540
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<211> 999 :

<212> DNA

<213> Streptococcus pneumoniae

<400> 202

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agaacctact	acaaaaaggg	ggacctcaaa	gaaacctact	ggcgagtgat	tgatggtaag	180
tactattatt	ttgattctct	atctggagag	atggttgtcg	gctggcaata	tatcccgttt	240
ccatctaaag	gtagtacaat	tggtccttac	ccaaatggta	tcagattaga	aggttttcca	300
aagtcagagt	ggtactactt	cgataaaaat	ggagtgtctac	aagagtttgt	tggttgga	360
acattagaga	ttaaaactaa	agacagtgtt	ggaagaaagt	acggggaaaa	acgtgaagat	420
tcagaagata	aagaagagaa	gcgttattat	acgaactatt	actttaatca	aaatcattct	480
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aatggcaact	ggtactatgc	ttatagctca	ggtgctttgg	cagtgaatac	gaccgtagat	960
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<210> 203

<211> 1884

<212> DNA

<213> Streptococcus pneumoniae

<400> 203

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gaagattatg	atttcccgaga	tggaagtgat	tctcgctatc	catggagaga	aggaattgaa	240
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caaaaacttg	attttatttt	ggtgacccat	accacacagt	atcatattgg	aaatgttgat	360
gaattactgt	ctacctatcc	agttgaccga	gtctatctta	agaaatatag	tgatagtcgt	420

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aacaaatcgg aatcagaaca gtag 1884

<210> 204

<211> 957

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 204

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<210> 205

<211> 1542

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 205

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 ggagatgggt cggttccttg gtatgttact tcggtatcca tttttgccac aatgctcagt 180
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<211> 2481

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 206

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<211> 888

<212> DNA

<213> Streptococcus pneumoniae

<400> 207

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<211> 624

<212> DNA

<213> Streptococcus pneumoniae

<400> 208

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<210> 209

<211> 6702

<212> DNA

<213> Streptococcus pneumoniae

<400> 209

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<211> 1476

<212> DNA

<213> Streptococcus pneumoniae

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<210> 211

<211> 1413

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 211

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<210> 212

<211> 1008

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 212

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<210> 213

<211> 1332

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 213

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09260757 012504

<210> 214

<211> 1428

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 214

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 gcaaccctaa ccaaatatgt caccctgctc aatgacaagg ctttggatag tggcttagag 180
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0059787 012504

<210> 215

<211> 1827

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 215

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 agcgggtcttg agactgggtt gattgaaatg caagactttg cagaaggaac atctagtcgt 180
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09759797.012604

<210> 216

<211> 705

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 216

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 ccaattccaa acaagggaga cggagactgg tcttacgctt ggattcctgt tgtaggccct 660
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<210> 217

<211> 1008

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 217

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09259707 043504

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 cctcactatc tccgtggaac atctggcgct gccaaactcc gtggagccat ttcgcaagcc 960
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<210> 218

<211> 411

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 218

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<210> 219

<211> 3300

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 219

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09759797.043504

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<210> 220

<211> 3651

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 220

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<211> 648

<212> DNA

<213> Streptococcus pneumoniae

<400> 221

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<210> 222

<211> 1224

<212> DNA

<213> Streptococcus pneumoniae

<400> 222

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<210> 223

<211> 570

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 223

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<210> 224

<211> 936

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 224

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<210> 225

<211> 1977

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 225

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<210> 226

<211> 867

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 226

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867

<210> 227

<211> 837

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 227

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<210> 228

<211> 1044

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 228

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<211> 1299

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 229

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<210> 230

<211> 303

<212> DNA

<213> Streptococcus pneumoniae

<400> 230

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<210> 231

<211> 717

<212> DNA

<213> Streptococcus pneumoniae

<400> 231

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<210> 232

<211> 1269

<212> DNA

<213> Streptococcus pneumoniae

<400> 232

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<210> 233

<211> 1959

<212> DNA

<213> Streptococcus pneumoniae

<400> 233

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095970 04304

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<210> 234

<211> 1278

<212> DNA

<213> Streptococcus pneumoniae

<400> 234

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<210> 235

<211> 1692

<212> DNA

<213> Streptococcus pneumoniae

<400> 235

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<210> 236

<211> 1692

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 236

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<210> 237

<211> 1140

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 237

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<210> 238

<211> 1338

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 238

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<210> 239

<211> 858

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 239

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<210> 240

<211> 1212

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 240

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<210> 241

<211> 981

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 241

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<210> 242

<211> 1281

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 242

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<210> 243

<211> 1263

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 243

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<210> 244

<211> 2355

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 244

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<210> 245

<211> 1542

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 245

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 ggagatgggt cggttccttg gtatgttact tcggtatcca tttttgccac aatgctcagt 180
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<210> 246

<211> 1455

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 246

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<210> 247

<211> 462

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 247

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<210> 248

<211> 855

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 248

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T09270.26269260

<210> 249

<211> 1185

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 249

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<210> 250

<211> 1347

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 250

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 aaaaagccat ctgcaacgga ggaataa 1347

<210> 251

<211> 1002

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 251

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<210> 252

<211> 1278

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 252

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<210> 253

<211> 1380

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 253

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<210> 254

<211> 618

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 254

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<210> 255

<211> 1200

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 255

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<210> 256

<211> 714

<212> DNA

<213> Streptococcus pneumoniae

<400> 256

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aagaatttcc aatcctactc tgtgattgtg gtacgaagtc aagagaagaa agatgccttg 180
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gactatgctg gggcgctg gaccacaagc tggagtcagc gcctagcaga acagtttggt 660
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<210> 257

<211> 606

<212> DNA

<213> Streptococcus pneumoniae

<400> 257

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<210> 258

<211> 843

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 258

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<210> 259

<211> 801

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 259

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attacagagg aggaaaacta a 801

<210> 260

<211> 390

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 260

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agagaagatc cggagtatgc caaggagcaa gtctgtgaaa aactgacaga agttaaggag 180
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gacagtatac ttgctcaaac taaatcctat gcttttcaag cgacagaagc atcaaaaaaat 300
caattaaata atctcaagga gcaatggcaa gaaaaagccg aagctcttga tgactcagaa 360
gagattgtga ttgatataac agaagaataa 390

<210> 261

<211> 618

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 261

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09760707 01504

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<210> 262

<211> 1914

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 262

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<210> 263

<211> 684

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 263

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 aattacctca aacgagtcga ggctgaggaa aactggctca agaaccatac cgagtctggc 660
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<210> 264

<211> 438

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 264

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gaaatagatg aaggatag 438

<210> 265

<211> 558

<212> DNA

<213> Streptococcus pneumoniae

<400> 265

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ttgaccccaa aagaatttga aagcgataaa aatccgtttt ttgaagtttt caaagtttcg 540
aaagtaaccg cccaataa 558

<210> 266

<211> 1437

<212> DNA

<213> Streptococcus pneumoniae

<400> 266

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<210> 267

<211> 1347

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 267

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<210> 268

<211> 1974

<212> DNA

<213> Streptococcus pneumoniae

<400> 268

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 aaactgacag aaattgtatt aaatgaaatg aaggaaaagg agaaagaaga atga 1974

<210> 269

<211> 1416

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 269

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 ggttccattt tattgcaact gtcaaagtag acgacaacag ctaaccagtc tcagattaat 360
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09769767 045604

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<210> 270

<211> 555

<212> DNA

<213> Streptococcus pneumoniae

<400> 270

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 ttttcaggtc ttggtcaaac agcagaggaa catttgtcaa aatcctttga aattattgac 180
 gataaatatgg tggtagaaaa ggatatcttt ttccatacca tgtgtgaaca ccacttcttg 240
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 gaggcggaac atatgtgtat gagtatgcgt ggtgttagaa aaccaggcac tgcaaccttg 480
 acgacagtag ctctgtgtct atttgaaaca gataaggatc tccgtgacca agcttatcgt 540
 ttaatggggc tataa 555

<210> 271

<211> 1050

<212> DNA

<213> Streptococcus pneumoniae

<400> 271

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 gtaggaatta cgtctgtttt acttttactt tggggaggaa ctgccaccta tatggaggct 240
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00760707 013604

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 aaactagccc ttctagcctt actaggagct ggtttggttt tactagtctt gtatttgcct 1020
 tatcaggtaa aacgtcagat gcaggactaa 1050

<210> 272

<211> 1197

<212> DNA

<213> Streptococcus pneumoniae

<400> 272

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 gctcctgaat gggttaaaatt attggggaga aaaatggaag ttgtgaattc tacaattcgc 180
 agtgtagaca ttgataaaga actttttgaa agctataaaa caggacctca tataaattat 240
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 gattccgata tcattgtaac tggggaacta gctactttgt ttgagataga tctcaaagga 360
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 cactatgcta gtcattgataa accttggaat acatatagta tatctagact acgtgaatta 720
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00769787 042504

<210> 273

<211> 1218

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 273

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<210> 274

<211> 2292

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 274

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09750707.043604

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<210> 275

<211> 960

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 275

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<210> 276

<211> 954

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 276

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 gccaaaacct tcatccaagt aaaagttgat ttttaccaa aatatagaca gtaa 954

<210> 277

<211> 1614

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 277

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<210> 278

<211> 315

<212> DNA

<213> Streptococcus pneumoniae

<400> 278

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 ggtgaaaaaa tttaa 315

<210> 279

<211> 792

<212> DNA

<213> Streptococcus pneumoniae

<400> 279

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 aatgactata cgattgcaga tattgctatc tggctcttgg atggacagtt agttcaagga 660

00760787 013601

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 gaaattaaat ag 792

<210> 280

<211> 939

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 280

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 aaagagttaa attctgctat caaggacatt caaattactt ccatcagtca aaaaacaaaa 840
 ctcatctgct atgagttaga tggatcatc cataccagta tctggcgtcg ccacgaaacc 900
 tggcaaaata tctttcatca agaaacaaaa aaagaatag 939

<210> 281

<211> 795

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 281

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00760797 012504

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 agtttggaag atatcacaga tgacattttc aaatttaca ccaacttcac agaagaaacg 480
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 gacttacata tgatgcaggt tgtgggacat cctgtagctc ctgaaaatgc acgacctgaa 720
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<210> 282

<211> 819

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 282

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 cctgaagtaa aggcagccgc aaatgtagtg acgccgatga ccaacgatga ggaagctgtc 780
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007607012501

<210> 283

<211> 1257

<212> DNA

<213> Streptococcus pneumoniae

<400> 283

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<210> 284

<211> 942

<212> DNA

<213> Streptococcus pneumoniae

<400> 284

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<210> 285

<211> 1512

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 285

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<210> 286

<211> 1332 .

<212> DNA

<213> Streptococcus pneumoniae

<400> 286

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<210> 287

<211> 2349

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 287

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<210> 288

<211> 1245

<212> DNA

<213> Streptococcus pneumoniae

<400> 288

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<210> 289

<211> 1269

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 289

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<210> 290

<211> 621

<212> DNA

<213> Streptococcus pneumoniae

<400> 290

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<210> 291

<211> 444

<212> DNA

<213> Streptococcus pneumoniae

<400> 291

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003697 04360

<210> 292

<211> 1521

<212> DNA

<213> Streptococcus pneumoniae

<400> 292

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1521

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<212> DNA

<213> Streptococcus pneumoniae

<400> 293

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<210> 294

<211> 900

<212> DNA

<213> Streptococcus pneumoniae

<400> 294

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<210> 295

<211> 729

<212> DNA

<213> Streptococcus pneumoniae

<400> 295

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<210> 296

<211> 1083

<212> DNA

<213> Streptococcus pneumoniae

<400> 296

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<210> 297

<211> 1380

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 297

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<210> 298

<211> 666

<212> DNA

<213> Streptococcus pneumoniae

<400> 298

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<210> 299

<211> 540

<212> DNA

<213> Streptococcus pneumoniae

<400> 299

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<210> 300

<211> 1872

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 300

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<210> 301

<211> 1053

<212> DNA

<213> Streptococcus pneumoniae

<400> 301

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<210> 302

<211> 528

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 302

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<210> 303

<211> 477

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 303

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097607 26269260

<210> 304

<211> 498

<212> DNA

<213> Streptococcus pneumoniae

<400> 304

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<210> 305

<211> 771

<212> DNA

<213> Streptococcus pneumoniae

<400> 305

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09697 0369260

<210> 306

<211> 471

<212> DNA

<213> Streptococcus pneumoniae

<400> 306

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<210> 307

<211> 1953

<212> DNA

<213> Streptococcus pneumoniae

<400> 307

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005593 045594

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<210> 308

<211> 2304

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 308

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00509 04504

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<210> 309

<211> 528

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 309

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<210> 310

<211> 471

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 310

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 accctttgtg gtaatgatgt ctgtcttato atctgtgaag atgcagatac tgctcaaaaag 420
 tgctttgaag aactgaaaaa attcgcccca ccatttttct ttgaagaata a 471

<210> 311

<211> 1488

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 311

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00760787 045604

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<210> 312

<211> 804

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 312

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<210> 313

<211> 1527

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 313

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<210> 314

<211> 714

<212> DNA

<213> Streptococcus pneumoniae

<400> 314

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 cccattcttc aaggtttgat tccaatgaa actatcaaac ttcttgatat cggggctggg 240
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 gaattattag aagctaagaa tgccctcaat ctcttttta gtaaggtcga agacaatctc 600
 agctacgccc taccgaatag agatccgcgc tatatcacag tggtagaaaa gaaaaaagaa 660
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<210> 315

<211> 807

<212> DNA

<213> Streptococcus pneumoniae

<400> 315

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 gaaaatgacc gtgccatgct ggaagtcgtt ggaaaccccg ttgtcatgga aaatggaaat 720

ccagaaatca aaaaaatcgc caaatacatc accaaaacaa atgacgaatc cggcgttgcc 780
catgccatcc gaacatgggt actgttaa 807

<210> 316

<211> 561

<212> DNA

<213> Streptococcus pneumoniae

<400> 316

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tttaaagcgg cagatttcct tcaaacacct gaagaggaaa agtcggttcc taaagttgat 540
tttagcggtt taggtgacta a 561

<210> 317

<211> 900

<212> DNA

<213> Streptococcus pneumoniae

<400> 317

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ggtggttttg ttattgcact gattatcggc tttatctacg ctttgtctat gatttttcaa 180
tcgacagaga ttgtcatgtc catgaatgga gcgcgtgagg tggatgagca aacggcacca 240
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<210> 318

<211> 543

<212> DNA

<213> Streptococcus pneumoniae

<400> 318

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 cttgcagttg ggaaagtaca atatgaagac cgtatgtatt tottagatta tcaactatct 180
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<210> 319

<211> 861

<212> DNA

<213> Streptococcus pneumoniae

<400> 319

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095697 04360

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<210> 320

<211> 534

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 320

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catcacctcg aaattcaaatt tactagagaa atcgctaagg aacagggcat tcgtcaccat 180
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atttcaatcg acccctacta caactacggt aagcaaggaa ctaagtatga gggcttggca 480
gaacaacgcc tcttccaaca cgacctttat ccagagaaaa ttgacaaccg ctaa 534

<210> 321

<211> 3711

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 321

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acaaatgagt cagcagtact tgaaaaaact gtagagaaaa cggatgcttt ggcaacaaat 180
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<210> 322

<211> 1350

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 322

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gcaactggag	gaaaagcata	g				561

<210> 324

<211> 651

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 324

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<210> 325

<211> 525

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 325

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00769707 20200920

<210> 326

<211> 804

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 326

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<210> 327

<211> 834

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 327

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09759797.043504

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 gaagaactgc gtcgtgacga taactatcag gggcacaatc tggaattatt agccagctta 780
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<210> 328

<211> 726

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 328

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 gaagatgaca tagcaagtct agtagaagta ggagaaaagc ctgaatttca aacagatttg 420
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 gtatga 726

<210> 329

<211> 936

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 329

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 gaccagagc atggcttgca gactgaggca ggactagttt atgacctagc tagtgtcagc 180
 aaggttggtg gggttggcac agtttgtacc ttcttggtgg aaataggtca attagatatt 240
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<210> 330

<211> 483

<212> DNA

<213> Streptococcus pneumoniae

<400> 330

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 ttggactttt tctttgattt caatcgcgtc tttgagattg atgatttggt gaccaacact 420
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 taa 483

<210> 331

<211> 792

<212> DNA

<213> Streptococcus pneumoniae

<400> 331

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gcgccccgac tagctaaatt cgatggacaa gcaattaaaa atgacttatt aaaatcagca 180
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 gcaatcacct atttgatggt tctttggctt gggtctatgc tgctttatag tgccttgctt 660
 tactatatgg ttctatgac gagtttgatg caagctagct atggggatgt aagtttgatg 720
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 gataatgttt aa 792

<210> 332

<211> 651

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 332

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 caggatgctg ttatcttttt caagagagaa ttgatttcaa ttttttctta taatgactat 180
 tctgaagcga atttagaaat ccccaaacta ttgttaaacc ttctgctttt catggttagga 240
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 ctgatagcac tgattagtgc gggcgtggt ttttctttt ttctctattt ttagcattt 540
 gtgggacaag aatggatgat ggatcatatt gtaacagtgt atttagtact cttaagttaa 600
 ttagttatgt tgattgttag tcgcttgga gagaaattta agaaaggata a 651

00769797 012501

<210> 333

<211> 525

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 333

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 tatgatagca agaccttggt gtttgcagta gataaggaag atatcggaac ggaaattatt 180
 ggtatagcta aaggaagcat cgaaagtatg cataatcttc ctgtaaactc agcaggtgcc 240
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 gggggagtta atggtacaga gccagctggt catgaaatcg cagagtataa gggatctgat 360
 tcgcttgtaa ctcttactac aaaaaaagat tatacttaca aagctcctct tgctcagcag 420
 gcacttcctg aaacaggaaa caaggagagt gacctcctag cttcactagg actaacagct 480
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<210> 334

<211> 1518

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 334

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 tatccaatac tagacaatag tatttttcaa tcaatattcc aagtaatgag ctctgcagga 180
 gaggttgat tcaagtaattt gtcactactt ctctgtgtgg gattatgtat tggcttagcg 240
 aaacgagata aaggaaccgc tgcgttagca ggagtaactg gttacttagt tatgactgca 300
 acgatcaaag ctttggtaaa actttttatg gcagaaggat ctgcaattga tactggagtt 360
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00769709 01504

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 caagttgata aagcactttt aaaacaaatt ggtgcagttg atgtcttaga agtgaagggt 1440
 ggcattcaag caatctatgg agcaaaagca atcttatata aaaatagtat taatgaaatt 1500
 ttaggtgtag atgattaa 1518

<210> 335

<211> 1329

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 335

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 acagaaatca cttggtgggc attcccagta tttacccaag aaaaaactgg tgacggtgtt 180
 ggaacttatg aaaaatcaat catcgaagcg tttgaaaaag caaaccaga tataaaagt 240
 aaattggaaa ccatcgactt caagtcaggt cctgaaaaaa tcacaacagc catcgaagca 300
 ggaacagctc cagacgtact ctttgatgca ccaggacgta tcatccaata cggtaaaaac 360
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 gaaaacatcg tacaagcaag taaagctgga gacaaggctt atatgtatcc gattagttct 480
 gccccattct acatggcaat gaacaagaaa atgttagaag atgctggagt agcaaactt 540
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09759307-04504

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<210> 336

<211> 840

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 336

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 tcacaacctg atacaattgt tattcctcct cagtggttcc ctaaaatgcc aaccatggaa 180
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 accaactatg gtttgattat ggcaggagct gcccttgctg ctgttccaat cgtcacagtc 780
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<210> 337

<211> 1890

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 337

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 acggcagagt ttagacagaa gatagtttac cagtttgagg aggactttaa gggccaaatc 180
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095097 04504
 105070 1020200

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<210> 338

<211> 2661

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 338

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<210> 339

<211> 1998

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 339

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<210> 340

<211> 1173

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 340

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 caagtatgga agttggatga ttcgtattcc tatgatgac gggtgcaaat tgtaagagac 240
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<210> 341

<211> 1566

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 341

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 tggacccagg atgatgatag caacggagct gtcaaaatcg atgggaccaa tcagtatgcc 180
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F09769707.012601

<210> 342

<211> 741

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 342

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 ggaagcggaa aatcgacctt cctacgctcc attaacctac ttgaaacacc aactgatgga 180
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 atggaatttg cccgtgatgt ctctcaccgt gttatcttta tggataaggg cgtgatcgct 660
 gaagaaggta aaccagaaga cctcttcacc aatcctaaag aagaccgaac aaaagagttc 720
 cttcaacgct atctcaaata a 741

<210> 343

<211> 690

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 343

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 ggcaattttat tctggattca aaatatcttg agtttacttt ttattggagt catgattgtg 180
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 cttcttcctt ctattttatt tgctctccct catttttcaa gcctgcctag tctgttagat 540
 atcttcgtct ttgcaacagt tggaatcatc tttgctgggt tgacccgcta taccaagagc 600
 atttatccat cctatgcggt gcatgtgatc aataatattg tagcgacctt cccgtttttg 660

ctcacttttc tacatagggt cttggggtaa

690

<210> 344

<211> 1040

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 344

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gcatgtggta accgctcttc tcgtaacgca gcttcatctt ctgatgtgaa gacaaaagca 120
gcaatcgtca ctgatactgg tgggtgtgat gacaaatcat tcaaccaatc agcttgggaa 180
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ggagaattcc ctggcggta agtgatcgtt tactcattga aggataaagg ggttgacttg 960
gcagtaacaa acctttcaga agaaggtaaa aaagctgtcg aagatgcaaa agctaaaatc 1020
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<210> 345

<211> 1059

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 345

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ttctatacag cctttggcag tctgcgtggg attggagaaa tcttccgtgc tatgggtcct 180

00769707 042604

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<210> 346

<211> 831

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 346

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 ccggttattt tggccctggt ccaagcccta tcaagagttg acttttttaa gacaggtcat 480
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 ttgaataatc cattcaagat tatcgcagag cgcgaggccg tagtacaggc acaaaaagat 780
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00369928269260

<210> 347

<211> 795

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 347

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 aatctgcgta ccaaagtcac tatcccagtt cactatgata tctggtctaa cttcatggct 600
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 catccattta tctgggaagt tggcggttaag tacacttatc ctcaagatca acacttagta 720
 gaataccatc atccacgtgg ttttgatgat tgttttgaac aagactctaa cattcaattt 780
 aaagctttgc tataa 795

<210> 348

<211> 585

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 348

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 gtagaagaac ccttgaaatt attgtcactt gtttttgttt tggctttgat tcctgtgcga 180
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 gaaacagagt tgcttttagc gattccagt gttacggcta ttgctctcta tggtttttat 540
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<210> 349

<211> 390

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 349

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 tctcaacgtt tggatataga cattctgacg gaaatggaaa acttcctctc tgataaagaa 360
 aagcaattga acgttaggac ttggaagtag 390

<210> 350

<211> 975

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 350

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 gacatattgg tggaacgca ggtctatcgc caggaacttc tctatggaga gagggaagcc 240
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975

<210> 351

<211> 588

<212> DNA

<213> Streptococcus pneumoniae

<400> 351

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 atcaaaaaga aattaaactt tgacccgagt gacgatttca tcctcttttc atctgtcagt 540
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<210> 352

<211> 891

<212> DNA

<213> Streptococcus pneumoniae

<400> 352

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cctgagtcag aagactttta tcaacattta ttggccttga ttgagccgat tctgccaagt 720
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 cgtagtgtgg catttgctaa acgcttggcg caggacttat ccaagaattg gtctgttaat 840
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<210> 353

<211> 978

<212> DNA

<213> Streptococcus pneumoniae

<400> 353

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 atccttgaaa gtgacatgat tgctcctaggg ccagggttccc tctttacctc tattttgccc 600
 aatatcgtga ttaaggaaat tgggcgggct cttttggaaa ccaaggcaga aattgcctat 660
 gtctgcaata tcatgacca acgtggggag acggaacact ttacagatag cgaccacgtg 720
 gaagtcttgc atcgtcacct tggtcgccct tttatcgaca ctgtcttggt gaatattgaa 780
 aaagtgcctc aggaatacat gaattccaac cgttttgatg aatacttagt gcaagtggaa 840
 caogattttg taggtctttg taagcaagtt tcgcgcgtga tttcatctaa cttccttcgt 900
 ctggaaaatg gcggtgcctt ccacgatgga gatttgattg tggacgagtt gatgocgatt 960
 atacagggtga aaaaatga 978

<210> 354

<211> 1179

<212> DNA

<213> Streptococcus pneumoniae

<400> 354

atgaaaaatt tgataaagtt gctaataatt agattgattg ttaacttagc agacagtga 60

ttttatatag tagcattgtg gcacgttagc aataattatt ctctgagcat gttcttagga 120
 atattttattg cagtaaatta tctaccggat ttgttactaa tcttttttgg accagttatt 180
 gacagagtaa atccgcaaaa aattcttata atatcaattt tgggttcaatt agcagtggct 240
 gtaatatattt tattattatt aaaccaata tcattttggg tgataatgag tctagtgttt 300
 atttcagtaa tggctagctc cataagttac gtgatagaag atgtgttgat tctcaagtg 360
 gtagaatatg ataagattgt atttgcaaat tctcttttta gtatttcgta taaagtatta 420
 gattctattt ttaattcatt cgcattcatt ttacaggtgg cagtaggatt tattttattg 480
 gttaagatag atataggcat atttttactt gctctattta tattgttggt gttaaaattt 540
 agaactagca atgcgaatat agaaaacttc tctttcaaat attacaagag agaagtgttg 600
 caaggtacaa agttttattt aaataataaa ttattattta aaaccagtat ttctttaacg 660
 ctataaaact ttttttatcc atttcagaca gtagttgtac cgattttttc tttcgatat 720
 tttgatggctc cgatttttta tgggtatttt ttaactattg ctgggttggg tgggtatattg 780
 ggaaatatgc tagcgccaat cgtaataaaa tatttaaaat cgaatcaaat tgttggtgta 840
 tttctttttt tgaacggctc aagttggta gtagcaattg ttataaaaga ctatacttta 900
 tcaattattt tatttttcgt ttgttttatg tctaaaggag tcttcaatat tattttta 960
 tcgttggtacc aacaaatacc tccacatcaa cttcttggtg gggtaaatac taccattgat 1020
 tctattattt cttttggaat gccaatggg agtttagttg caggaacgct tattgatttg 1080
 aatattgaat tagtggtaat tgctattagc ataccttatt ttttgttttc ttatattttt 1140
 tatacggata atggattgaa agaatttagt atatattag 1179

<210> 355

<211> 678

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 355

atgatgtcta acaaaaataa ggaaattctg atttttgoga ttctctatac agtcctcttt 60
 atgtttgatg gcgttaaatt gctggcttct ttaatgccat ctgccattgc aaattatctt 120
 gtttatgtag ttttagctct atatggctcc ttcttggtca aggatagatt gatccaacaa 180
 tggaaggaga ttagaaagac taaaagaaaa ttcttctttg gagtcttaac aggatggctc 240
 tttctcattc tgatgactgt tgtctttgaa tttgtatcag agatgttgaa gcagtttggtg 300
 ggactagatg gacaaggctc aatcagctc aatattcaaa gtaccttca agaacaacca 360
 ctactgatag ctgtttttgc ttgtgtcatt ggacctctgg tagaagaatt atttttccgt 420
 caggtcttat tgcattactt gcaggaacgg ttgtcagggt tactaagcat tattctggta 480
 ggacttggtt ttgctctgac tcatatgcac agtttggtc tatcagagtg gattgggtgca 540
 gttggttact taggtggagg ccttgctttt tctattattt atgtgaaaga aaaagagaat 600
 atctactatc ccctacttgt tcacatgtta agcaacagcc tctccttaat catttttagct 660

atcagtatag taaaatga

678

<210> 356

<211> 1158

<212> DNA

<213> Streptococcus pneumoniae

<400> 356

ttgaaaaagc caattatoga attcaaaaac gtctctaaag tttttgaaga cagcaacacc 60
 aaggttctca aagacatcaa ctttgagttg gaagaaggga aattctacac ctttctaggt 120
 gcatctgggt cggggaaatc aactatccta aacattattg caggtttact ggatgcgacg 180
 acaggagata tcatgctaga cgggtgtcgt atcaatgata ttccaaccaa caagcgcgac 240
 gtacataccg tcttccaatc ctatgccttg ttcccacata tgaatgtggt tgaaaatggt 300
 gcctttccac ttgcgttgcg taaaattgat aagaaagaaa tcgagcagcg tgtagcggaa 360
 gttctcaaga tggttcagtt ggaagggttat gaaaaacggt ccatccgcaa actttctgga 420
 ggacaacgct agcgtgtggc catcgcccggt gctatcatca accaaccocg tgtggtcttg 480
 ttggacgagc ctttatcagc gctggacttg aaattgagaa cagacatgca gtacgaattg 540
 cgtgaattac aacaacgatt gggcattacc tttgtctttg tctctcacga tcaggaagaa 600
 gctcttgcca tgagtgactg gattttcgtt atgaatgatg gcgagattgt ccagtctgga 660
 acccctgtgg acatctacga tgagccaatc aaccactttg ttgccacctt tatcggggag 720
 tcaaacatct tgccaggtac catgattgag gactacttgg tcgaatttaa cggcaaacgc 780
 tttgaagcgg ttgatgggtg gatgaagcca aatgaacctg ttgaggtcgt tattcgtcca 840
 gaggacttgc gcattaccct tctgaagaa ggcaagctcc aagttaaggt cgatacccag 900
 cttttccgtg gagttcatta tgaaattatc gcctatgacg aacttgaaa tgaatggatg 960
 atccactcaa cccgtaaggc tatcgtgggt gaggaaatcg gtctggactt tgaaccagaa 1020
 gacatccaca tcatgctct caatgaaacc gaagaagagt tcgatgctcg tattgaggag 1080
 tacgtagaaa tcgaagagca agaagcaggt ttgatcaatg caatcgagga ggaaagagat 1140
 gaagaaaaca agctctaa 1158

<210> 357

<211> 621

<212> DNA

<213> Streptococcus pneumoniae

<400> 357

atgaaatcaa tgagaatctt atttttgtta gctttaattc aaatcagttt gagtagctgt 60

09760787 043604

ttcctatgga aggaatgcat cttgtccttt aaacaaagta cagctttttt catcggaagc 120
 atgggttttcg tttcaggaat ctgtgctgga gtaaattatc tttatacccg taagcaagaa 180
 gtccatagtg tcctagccag taagaagtcg gtgaagcttt tttacagtat gttactctta 240
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 cagcaagaat tagttgactt tttattgcca tccttctttt tcctatttgg gctagatttg 360
 ctgattttttt tacccttgaa aaaatacgctg cgcgattttc ttgctatgct ggacagaaaa 420
 aagacagtgt tgggtgactat tttagcaaca cttcttttct taagaaatcc aatgaccatt 480
 gtctcacttc tgatttatat tggactgggc ttgttttttg cagcctatct tgtcccaaat 540
 tcggttaaga aggaagtttc cttttatggg catattttcc gagatcttgt attggtcatt 600
 gttacgctca ttttctttta g 621

<210> 358

<211> 1017

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 358

atgggttaaaa aaattattgg aatgggtgcta gctttacttt ctgtaactgt agtaggagta 60
 ggtgttttttg cttatactat ttatcaacaa gggacagaaa ccttagctaa aacctataaa 120
 aaaatcggtg aagaaaccaa gggtattgaa gcgactgaac ctctaaccat tctgttaatg 180
 ggagtggaca ccggaatgt tgaacgaact gaaacttggg tcggtagaag tgatagcatg 240
 atcttgatga cagtgaatcc taaaacgaaa aaaacaacaa tgatgagttt agagcgggat 300
 attctgacgc gcattgaatc aggggaatggg caggctcatg aagcgaaact gaactcagca 360
 tatgcagatg gtggagcaga gcttgctata gaaaccattc aaaaaatgat gaatatccat 420
 attgatcgct atgtgatggg caatatgaga ggattgcaaa aactagtgga tgcagtagga 480
 ggtattacag tcaataatat cctaggtttc ccaattttcta tcagtgacca agaagaattt 540
 aatactatctt ctatcgggtgt tggggagcaa catattgggg gagaagaagc cctagtctat 600
 gcacgaatgc gttaccaaga tcctgagggg gattatgggc gtcaaaaacg tcaacgtgaa 660
 gttattcaaaa aagtcatgga aaaagctctc agtttaata gcattggtca ttatcaagag 720
 attctaaaaag ctttgagtga caatatgcag accaatattg atttgtctgc aaaaagtatc 780
 cctaacttgc taggctataa agattcattt aaaaccattg aaactcagca gttgcagggt 840
 gaaggagaga tacttcaagg tgtttcttac cagattgttt cgagagcaca tatgttgga 900
 atgcaaaaac tactccgacg ttctttggga caagaagaag ttactcagct tgaaccaat 960
 gcggttttat ttgaagattt atttggcaga gcacctgttg gtgatgaaga taattaa 1017

0950707 04504

<210> 359

<211> 996

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 359

atgaaaaaac aagcctatgt cattattgct ctcacctcct tcctatttgt cttttttttc 60
 tcccacagct tgctggaaat acttgatttt gactggtcta tctttttgca cgatgtcgaa 120
 aaaacagaaa aatttgtctt tttattgttg gttttcagca tgtccatgac ctgtctctta 180
 gccctgtttt ggcgagggat cgaagagctt tctctaagaa aaatgcaggc taatctcaag 240
 cgtttattag cagggcaaga agtggttcag gttgcagatc cagatttgga tgccagtttc 300
 aagtccttat caggtaaaact taaccttttg acagaggctc ttcaaaaagc tgaaaatcag 360
 agccttgctc aggaagagga aatcatcgag aaggaacgga agcgaattgc tcgggatttg 420
 cacgatacag tcagtcagga gttgtttgcg gccacatga ttttatcggg tatcagtcag 480
 caggctttga aattggatag agaaaagatg cagaccaggt tgcagagtgt cacagctatt 540
 ttagaaacag ccagaaagga tttgcgggtt ttgctcttgc atttgcgacc agttgaactg 600
 gagcagaaga gcttgataga agggattcaa attcttttaa aagagcttga ggacaagagt 660
 gatcttaggg ttagtctcaa gcagaatatg acgaaattgc ctaagaaaat cgaggagcat 720
 atcttcgta tcctgcaaga gttgattagc aataccctcc gccatgcccc ggcattcttg 780
 ctagatgtct acctctatca gacagatgtt gaattgcaac tgaagggtgt ggacaatggg 840
 attggtttcc agttaggagg cttagacgac ttgagttatg gactgcgaaa tatcaaggag 900
 cgggttgaag atatggctgg aacagttcaa ctcttgacag ctcccaagca agggctggcg 960
 gttgatatcc gtattccctt gttagataag gaatga 996

<210> 360

<211> 867

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 360

atgattgttt ccattatttc tcaaggattt gtctgggcta ttctaggtct gggaaatcttt 60
 atgacattta ggatttttaa ctttccagat atgacgacag aaggttcctt cctcttgagg 120
 ggagctgttg ctgtcacttt gataaccaa ggcgtgaacc catttttagc gacacttggt 180
 gctgtaggag caggttgttt ggctggaatg gcagcaggcc ttctttatac aaaagggaag 240
 atcccaacct tgctctcagg gattttggtg atgacttctt gtcactcaat catgctcttg 300
 attatgggac gtgcgaattt aggcctgctt ggaaccaagc aaattcagga tgttttgcct 360
 tttgattcgg atttgaatca actcttgaca ggtctcatct ttgtgagtat tgttattgct 420

ctcatgctct ttttcttgga cactaaactc ggacaagcct atattgctac aggggataat 480
 cctgatatgg ctagaagttt cgggattcat actggacgca tggagctcat gggcttggtc 540
 ttatcaaagt gtgtgattgc ccttgcaggt gccctcattg ctacgcaaga aggttatgcc 600
 gatgtgtctc gagggatcgg gggttatcgtt gtggggcctt caagtttgat tattggagaa 660
 gttattttca agagtttgag cttggcagag cgtttgggta ctatcgttgt aggttctatc 720
 gcttatcaat ttttagtgtg ggcagttatc gcacttggct ttaatacaag ttaccttcgt 780
 ttatacagtg ccttgatttt agcagtcctgc ctcatgattc caacatttaa gcaaacatc 840
 ttgaaaggag ccaagttaag caaatga 867

<210> 361

<211> 1068

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 361

atgaaaaaaaa tgaaagtttg gtctactgta cttgcaacgg gagttgctct tactacactt 60
 gctgcttgct ctggaggttc aaattctacg actgcttctt catctgaaga aaaagctgat 120
 aaaagtcaag aattagttat ctattcgaac tcagtcctcaa atggctcgtg tgattgggta 180
 actgctaaag caaaagaagc tgggttttaaat ataaaaatgg ttgatatcgc tggcgctcaa 240
 ttagcagacc gtgttattgc tgagaagaat aatgcagttg cagatatggt atttggaatt 300
 ggtgctggtg attcaaataa aattagagat caaaaattac tagtacagta caagcctaaa 360
 tgggttagata aaattgatca atctttatca gataaagata attattataa tcctgtgatt 420
 gttcaaccat tagttttaat tggggcgctt gatgtaaaag aaatgcctaa agattggact 480
 gaattaggta gtaagtataa aggtaaatat tcaatttctg gtcttcaagg aggtacagga 540
 cgggcaattc tagcaagtat cttagttcga taccttgatg ataaagggtg attaggtgtt 600
 tccgaaaaag gttgggaagt agcaaaaaga tatttgaaaa atgcatacac tcttcaaaaag 660
 ggagaaagtt caattgttaa gatgttagac aaagaagatc caatacaata tggaatgatg 720
 tggggttctg gtgcattagt tggacaaaaa gaacaaaatg ttgttttcaa agttatgact 780
 cctgagattg gtgtaccatt tgtaactgaa caaactatgg ttttaagcac tagtaaaaaa 840
 caagcgttag ctaaagaatt tattgattgg tttgggtcaat cagaaattca agtagaatat 900
 agtaagaact ttggatctat tcctgcaaat aaagatgccc tcaaagatct acctgaagat 960
 acgaagaaat ttgttgatca agtgaaacca caaatattg actgggaagc tggttgaaag 1020
 catttgatg aatgggtaga aaaagctgaa ttagaatacg tacaataa 1068

<210> 362

<211> 1011

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 362

atgattaaat ttgataatat tcaaattaaa tatggtgatt ttggtgcaat tgataatctg 60
 aatttagata tacatgaagg ggaattttttt acatttcttg ggcttcagg atgtggtaaa 120
 tcaactactt tgagagcatt ggtaggttttt ctagatccat catcaggaag tattgaagtt 180
 aatggaacag atgtcactca tttggaacct gaaaagcgtg gaattggtat tgtatttcaa 240
 tcttatgcgc tatttccaac tatgactggt tttgataata ttgcatttgg tttaaaagtt 300
 aagaaggtag ctccagatgt tattaagct aaagtatcag cagtggcagc aaaaattaag 360
 atctctgatc aacagttaca gcgtaatgta tcagaattat ctgggggtca acaacaaagg 420
 gtagcattgg ctctgctctt ggttcttgaa cctaaaattc tttgtctaga tgaaccattg 480
 tcaaaccttg acgcaaaatt acgtgtagat ttgagaaaag agttgaaaag acttcaaaaa 540
 gagttaggta ttactacttt atatgttact catgatcaag aggaagcctt gactttatct 600
 gatagaattg cagtctttaa caatggatac atcgacagg tcggtacacc agtagagatt 660
 tatcataatt ctcaaaactga atttgtatgt gattttattg gagatattaa tgttttgacc 720
 gatgaaacag tccacgaagt attattgaaa aatacaagcg ttttcttaga ggataaaaaa 780
 ggatacattc gattagagaa agttcgattc aatcgtgaaa ctgaacaaga ttttattcta 840
 aaagggacaa ttattgatgt tgagttttct ggagttacaa ttcactatac aataaaagtt 900
 totgaaagtc agattcttaa tgtaacaagt attgatagtc aggctgctat tagatctgtc 960
 ggagaaagtg tggaattatt tatcacacca tcagacgttc tgcaatttta a 1011

<210> 363

<211> 1692

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 363

atgcgtcata aattaaattt aaaagattgg cttattcggt tagggttaat ctggttctta 60
 gtaacattta ttatttatcc aaactttgat ctagtagtga atgtatttgt aaaaggagga 120
 gaattttccc ttgatgctgt acatcgtgtt ctaaaatctc agagggcact tcagagtatt 180
 atgaacagtt ttaagttagc attttcactc attattacag ttaatgtcgt aggtattctt 240
 tgtgttctat ttacagagta ctttgatatt aaagggtgcta aaattttaaa attaggttat 300
 atgacctctt taatttatgg aggagtgggt ttagecactg gatataaatt tgtctatggt 360
 ccttatggat tgattacaaa atttttacaa aatgttatcc cttctttaga ccctaactgg 420

tttattgggt atggtgcagt cttattcatt atgacatttt caggaactgc taatcataca 480
 ttgttttttaa caaatacaat tccaagcggt gactatcaca ctattgagga tgctcgaaat 540
 atgggagcaa aaccatttac tgttttccga aaagtagtgt taccaacctt aattccaact 600
 ctatttgcac ttactattat gggttttctt agtggtttat ctgcagtagc agcaccatg 660
 attggtggtg gtaaagaatt tcaaaactata aatccaatga ttattacatt tgcagggatg 720
 gggaattctc gtgatttagc tgccctactt gcaattattt taggtattgc aactacaatt 780
 ttgcttacta tcatgaataa gatagaaaaa ggtggaaatt atatttctat ctctaagact 840
 aaagcgctc ttaaaaaaca aaaaattgcg tctaagcctt ggaatatcat tgctcacatt 900
 gtagcatatg gattgttcac agttttcatg cttccactaa tttttatagt attatactca 960
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 aattatcgct tattcttttag taatagtgcg gcattctctc cattcttggc cagctttatt 1080
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 agaaaacata aatctcggtt tgattttotta ttgaatatg gtgctctact tccttggtta 1200
 ctaccaagta cacttttagc agtaagttta ttatttactt ttaatcagcc acaatttctt 1260
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 aaaatcccat tttcttatag aatggtaagt gctattttat ttagtggtga tgatgagatg 1380
 gaagatgcag caagaagtat ggggtgcttca cctttttata ctatgatgaa gggttatcatt 1440
 ccatttattt taccggttgt tctctctgtt attgctttta actttaactc tttattaact 1500
 gacttcgact tatctgtatt cctttaccat cccctagctc aaccattagg tattacgatt 1560
 cgatctgcag gtgatgaaac agcaacatct aatgcacaag ctctggtatt tggtttataca 1620
 attgttctga tgattatttc tggaacggta ttataacttca cacaaagacc ggggcgtaaa 1680
 gtaaggaaat aa 1692

<210> 364

<211> 5

<212> PRT

<213> Artificial Sequence

<220>

<221> SITE

<222> (3)

<223> Xaa=any amino acid

<220>

<223> Description of Artificial Sequence: Cell wall
anchoring motif

<400> 364

Leu Pro Xaa Thr Gly

1

5

<210> 365

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 365

gcgggatccg ccaccatg

18

<210> 366

<211> 10

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 366

ttgcggccgc

10

<210> 367

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

0976970-0460

<400> 367

cggatccgcc accatgtctt ctaatgaatc tgccgatg

38

<210> 368

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 368

ttgcggccgc ctgttttagat tggatatctg taaagactt

39

<210> 369

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 369

cgcgatccg ccaccatgga ttttccttca aatttgagg

40

<210> 370

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 370

ttgcggccgc accgtactgg ctgctgact

29

09750707 042504

<211> 39

<213> Artificial Sequence

<223> Description of Artificial Sequence: Primer

cggatccgcc accatgagtg agatcaaaat tattaacgc

39

<211> 29

<213> Artificial Sequence

<223> Description of Artificial Sequence: Primer

ttgcggccgc cgttccatgg ttgactcct

29

<211> 38

<213> Artificial Sequence

<223> Description of Artificial Sequence: Primer

cgcggatccg ccaccatgtg ggacatattg gtggaaac

38

<210> 374

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 374

ttgcggccgc ttcacttgag caaactgaat cc

32

<210> 375

<211> 42

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 375

cgcggatccg ccaccatgtc acaagaaaaa acaaaaaatg aa

42

<210> 376

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 376

ttgcggccgc atcgacgtag tctccgcc

28

09369797.043604

<210> 377

<211> 43

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 377

cgcggatccg ccaccatgct gggtggaact ttctactatc aat

43

<210> 378

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 378

ttgcggccgc aactttcgtc cctttttgg

29

<210> 379

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 379

cgcggatccg ccaccatggg caattctggc ggaa

34

00769787 012604

37

<210> 383
<211> 34
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 383
cgcggatccg ccaccatgac ggcgacgaat tttc

34

<210> 384
<211> 35
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 384
ttgcggccgc ttaattcggt ttggaactag ttgct

35

<210> 385
<211> 40
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 385
cgcggatccg ccaccatggc tggtttttctt cgctatcatg

40

09759787-04504

<210> 386
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

34

<400> 386
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<210> 387
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31

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